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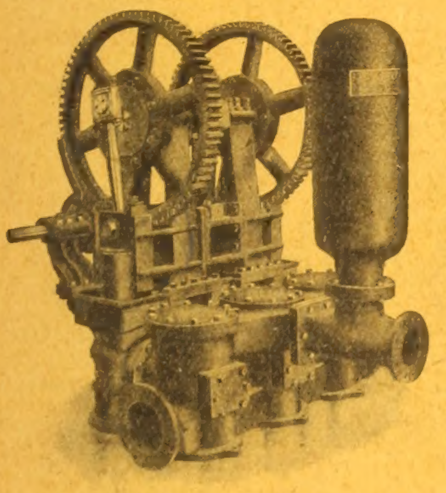
ESTABLISHED 1886

ntract Record and Engineering Review

Vol. 27 Toronto, January 1, 1913 No. 1



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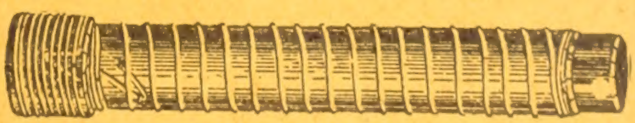

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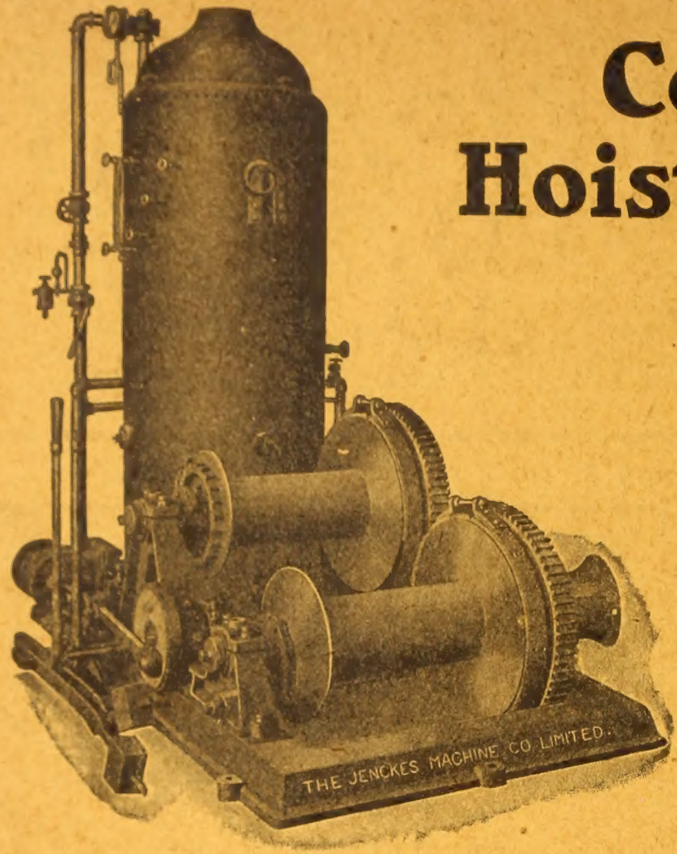

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peculiar requirements of
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¶ Great care has been taken to secur
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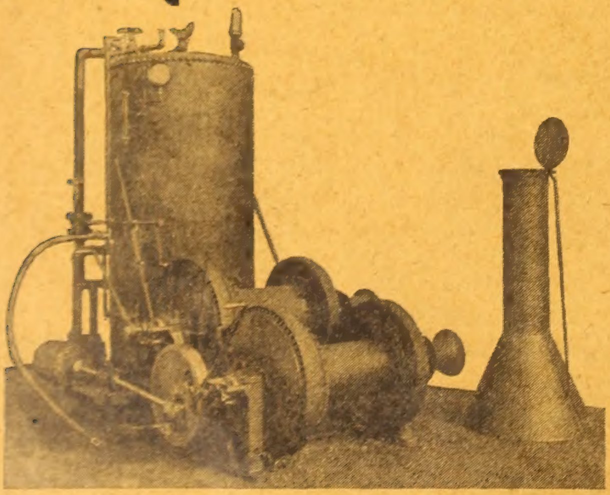

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It does its work with less human power, fuel, wear and expense, and with greater speed and accuracy than any other similar engine on top of earth.

When you need a Hoisting-Engine, let us prove these claims to you.

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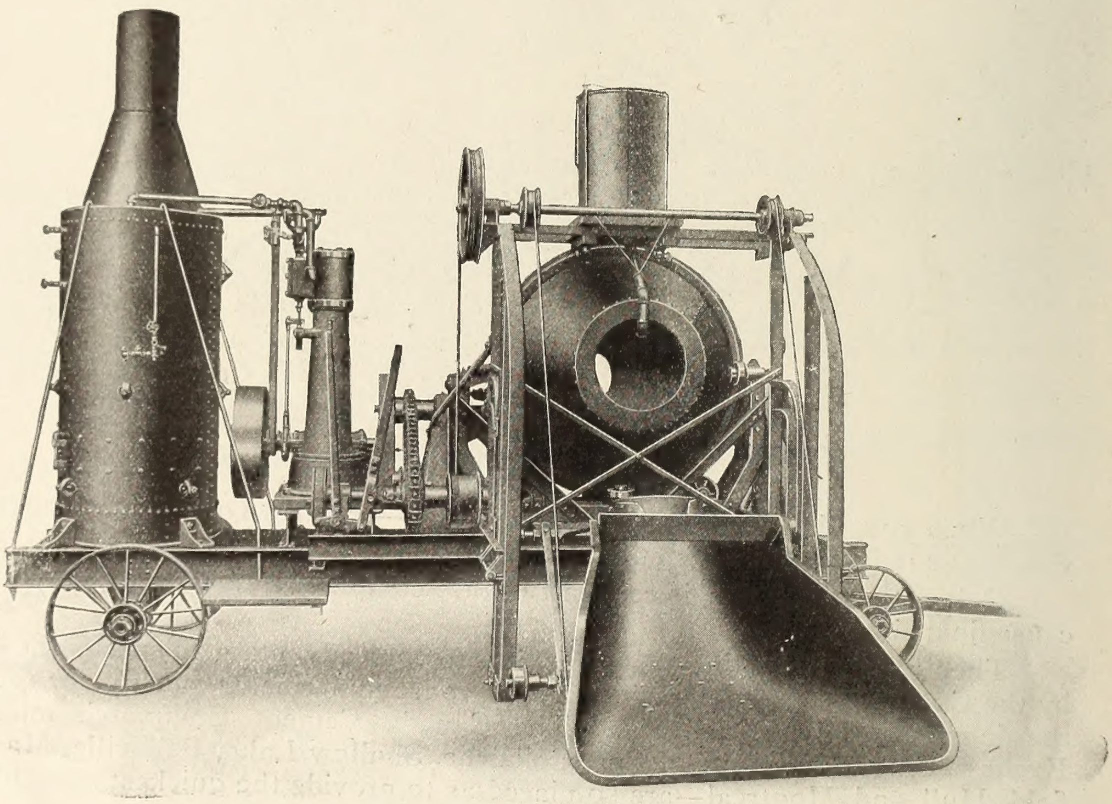

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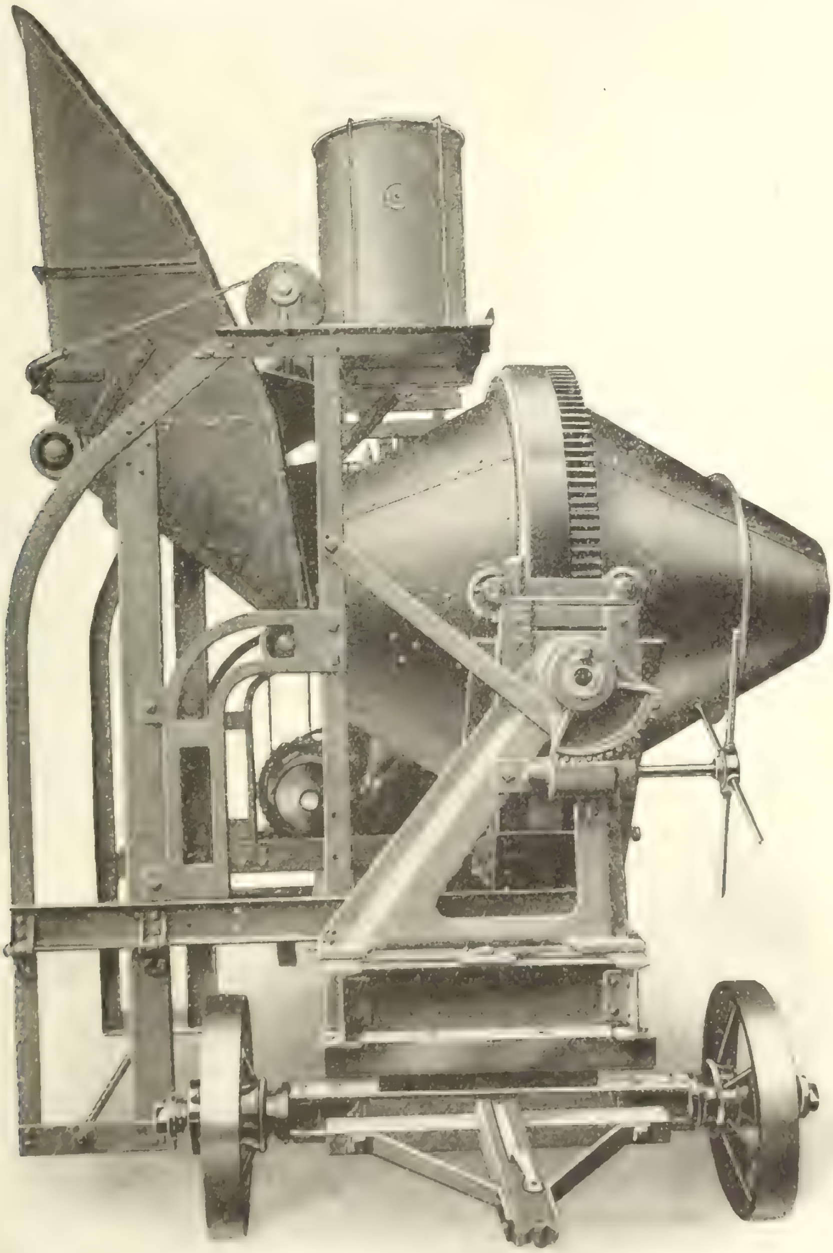

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New Residence for Lieutenant Governor of Ontario, Toronto. Provincial Architect Heakes, Architect.
Don Valley Brick and Porous Terra Cotta used throughout.

Don Valley Bricks

are used in the construction of the most important public buildings erected by the Provincial Government. They are specified by the leading architects for every building of importance. The latest example of the public recognition of their superiority is found in their use for the new Toronto Residence of the Lieutenant Governor of Ontario. Don Valley Bricks possess a beauty of color and an even texture and form which add that touch of distinction to a building that characterises it as fulfilling the essentials of decorative dignity.

Don Valley Hollow Tile Fireproofing is absolutely dependable for that structural strength necessary to resist the action of age or any other deteriorating influence. For many years its success as a staple and fireproof building material has been established in hundreds of practical tests in buildings throughout the country.

"SPECIFY DON VALLEY PRODUCTS"

THE DON VALLEY BRICK WORKS

Head Office: 36 Toronto St., TORONTO
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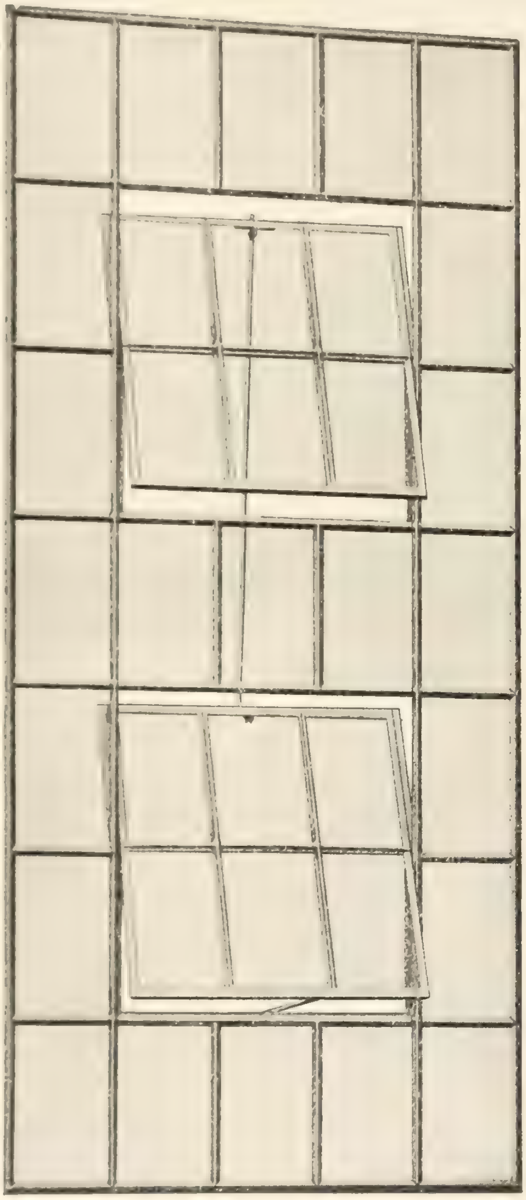

"Fenestra"

"Fenestra" TRADE MARK

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,
Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons
Railroad Shops, Warehouses, Barracks, etc.

We will help you to settle the problem of your window requirements—write us.

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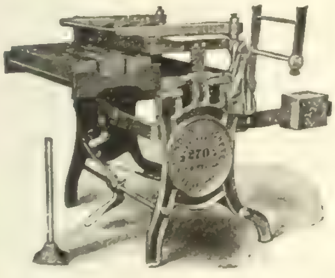
Before you Buy Machinery or Equipment of any kind

write to us for our 1912 CATALOGUE. It will save you TIME and MONEY. Do you know that we are the ONLY LARGE MANUFACTURERS who specialize on

Concrete Machinery and Contractors' Equipment

The following are a few of our lines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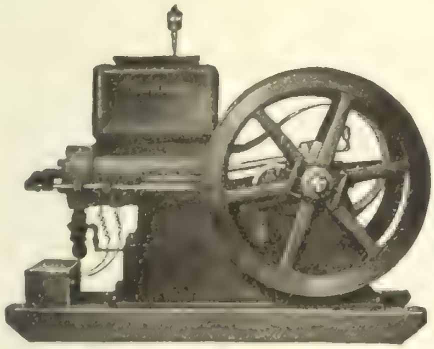
London Standard Drum Batch Mixer in five sizes any kind of power or equipment.

Drum Paving Mixer with forward loader and rear discharge.

Drum Paving Mixer with side loader and rear discharge.

London Automatic Batch Mixer No. 1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Automatc Batch Mixer Two sizes any kind of Power.

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Cement Block Machines.

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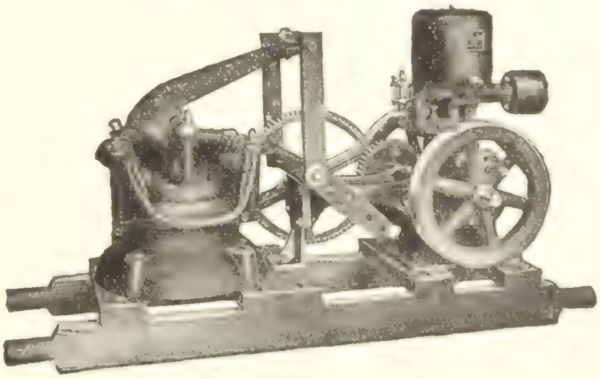
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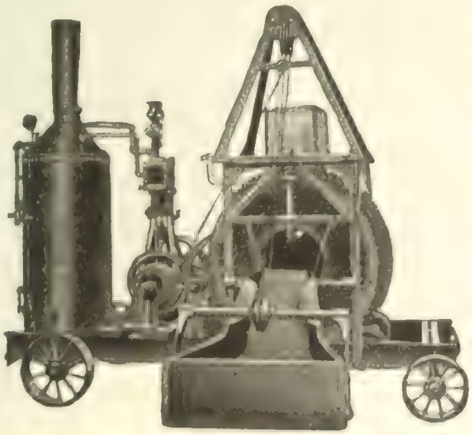
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Cement Tile Machines.
Side Walk Tile Machines.
Sill Step and **Window Cap Moulds.**
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Driers both Portable and Stationary.
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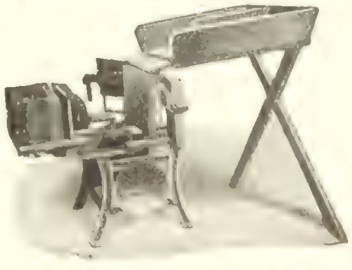
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And a Complete Line of Cement Working Tools.

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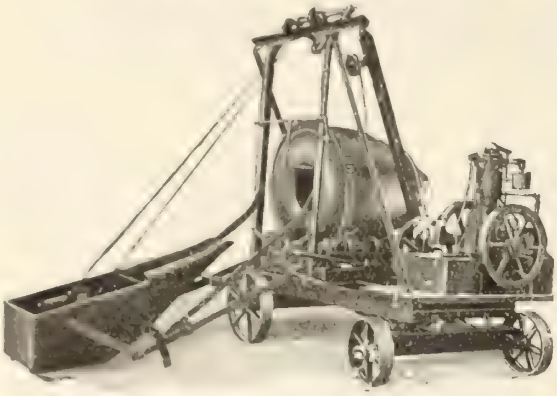
We are the Largest Manufacturers of Concrete Machinery in Canada

For Any Rush Job

You Are Forced to Admit

that

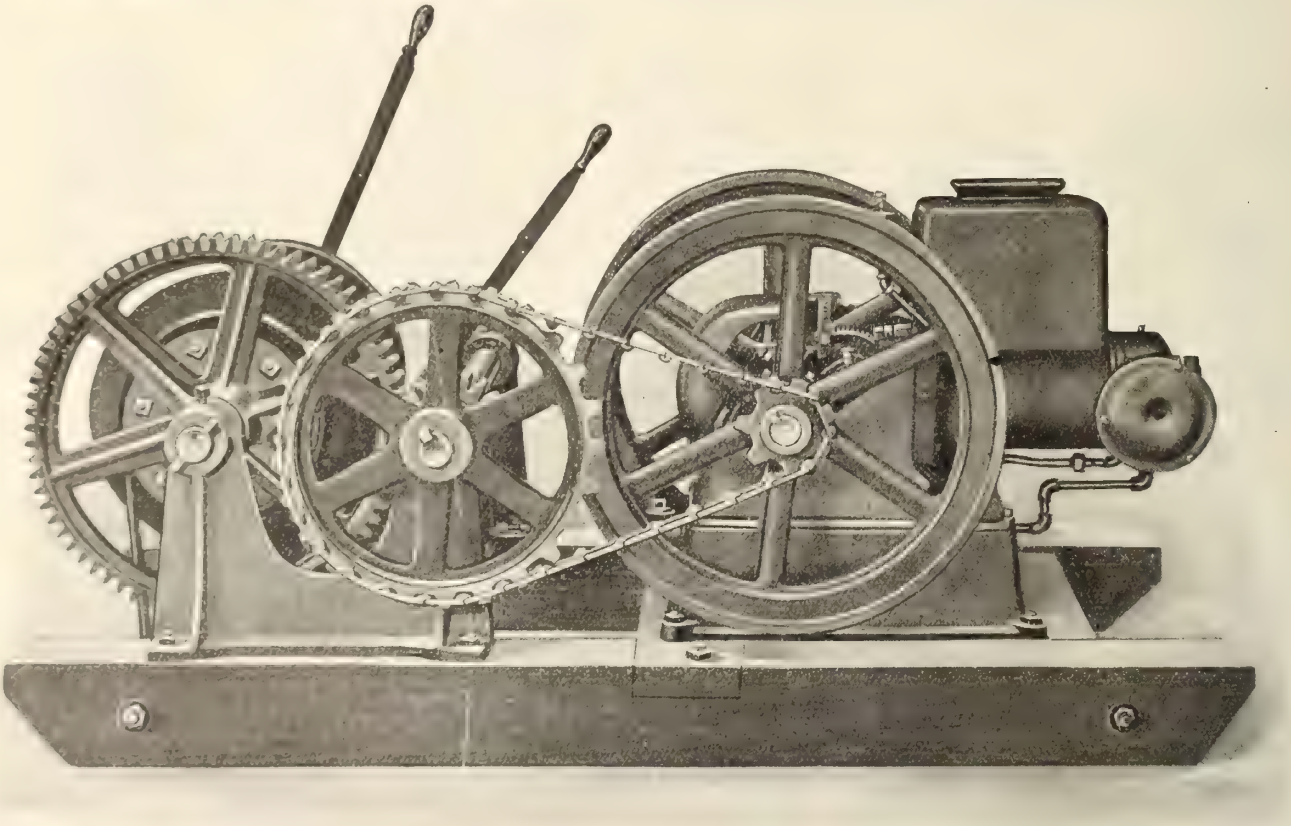
The Wettlaufer Improved Heartshape Mixer



Wettlaufer No. 1 Heartshape Mixer

will stand up to the work and see the job through with a certainty of good results that you can absolutely rely on. It will make yours a more profitable job by doing quick and perfect work with no stops for repairs.

Automatic operation—low running cost
Economical working throughout



Wettlaufer Single Drum Hoist No. 1

The most useful and complete hoist for all building and contracting purpose Its compactness size and general handiness give it great advantages over the ordinary large cumbersome hoist and enable it to be easily moved around from one part of the job to another. Its capacity for work and general utility are unlimited.

Let us send you particulars of our Hoists and Mixers—or come and see them. Continuous Demonstrations at

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Steelcrete
CONSOLIDATED

WHY

Steelcrete
TRADE MARK
CONSOLIDATED

Reinforcement is Superior to all Others

(12 REASONS)

Theoretical Considerations

(1) **It possesses a high elastic limit—not less than 55,000 lbs. per sq. in.** This is not attained at the sacrifice of quality or uniformity. "Steelcrete" is not a brittle and inferior steel but a tough, cold-drawn product with no equal in the market for uniformity of strength.

(2) **It provides against concentrated loads.** Its diamond-shaped structure enables it to distribute the effect of a sudden local load over a great many strands.

(3) **Attains a perfect bond in the concrete.** This is due to its mesh shape which does not permit any slipping and there is no possibility of it.

(4) **Perfect distribution of Steel.** Every foot of width possesses the theoretical amount of steel. The accuracy here attained is impossible in loose rod reinforcement.

(5) **Longitudinal reinforcement.** "Steelcrete" mesh possesses strength in the longitudinal direction of the pipe equal to one third the strength in the circumferential direction.

(6) **Temperature stresses are guarded against.** The form of the mesh provides a positive reinforcement against these uncertain but definite stresses.

Practical Considerations

(7) **"Steelcrete" mesh is essentially a fool-proof reinforcement.** With the use of this material the man with the brains that designs the construction obtains an efficiency of 100 per cent. with ordinary every-day inspection and unskilled labour.

(8) **"Steelcrete" Mesh is a stiff reinforcement.** It holds its position in the forms in a way that no other mesh equals. It is far more important to have the reinforcement placed correctly in a vertical direction than in the horizontal.

(9) **It is cheaper to install.** Requires less labour than any other mesh or system of rods.

(10) **It is easy of inspection.** Only those who know "Steelcrete" know the trouble, delay and anxiety this saves to both contractor and engineer alike.

(11) **It can be placed quickly.** This means a saving in overhead charges. This feature has been overlooked by a great many engineers and architects in the past.

(12) **ALFRED ROGERS IS NOW CARRYING IN STOCK HALF MILLION SQUARE FEET OF "STEELCRETE" FOR IMMEDIATE DELIVERY.**

ROGERS

Portland Cement

makes dependable concrete—carefully ground and screened—gives a quick and strong set. Any quantity, complete shipments.

ROGERS

Crushed Stone

in all sizes—clean and free from dust, dirt and mould. Guaranteed delivery — Send us your orders for crushed stone.

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French Caen Stone Cement

Monarque Brand and Cementa-line. Rich in appearance and of unlimited durability—as good as natural stone—but cheaper. Full particulars on request.

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  Cook, A. D.
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  Greening Wire Co., B.
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  Greening Wire Co., B.

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(Continued on page 14)

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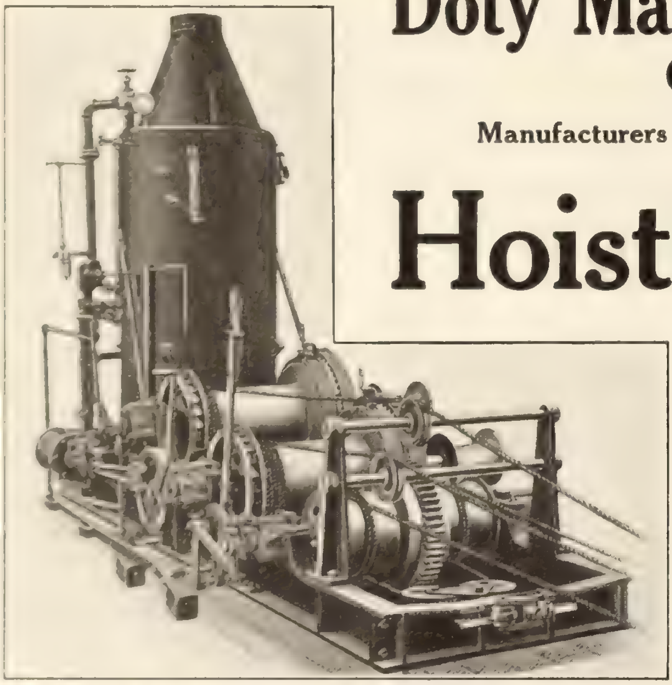
Doty Marine Engine & Boiler

Company Limited

Manufacturers of Superior

Hoisting Engines



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Contractors, Mines and Quarrymen

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To buy our Engines is a Guarantee of Satisfaction

Sawyer Belt will stand any weather

Exposure is the cause of many belting troubles. Neither leather or rubber belting, though expensive will stand both rain and shine.

Here is where **Sawyer Canvas Stitched Belt** shows its superiority. The compound in which it is immersed renders it pliable under all conditions.

It costs less—It wears more.

Try it in rain or shine

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AURORA, ILLINOIS
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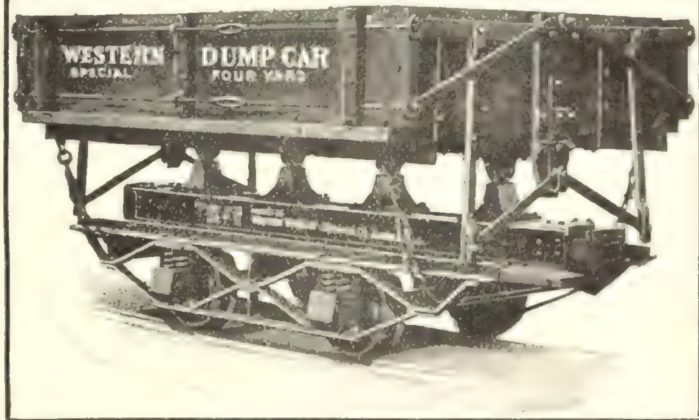

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The Toughest Stone for Macadam in Ontario

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1904	3.30	1909	200.46
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  [illegible] and Material Co.
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Screens
  Canada Wire & Iron Goods Co.
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Sewer Pipe
  Britnell & Co.
  [illegible]
  [illegible] Sewer Pipe Co.
  [illegible] Thomson Pipe Co.
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  Ontario Sewer Pipe Co.
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  Standard Drain Pipe Co.

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  Austin Drainage Excavator Co.
  [illegible]
  Mun. Engineering & Contracting
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Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
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  Canada Foundry Co., F. H.
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  Mahan & Company
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  Morrison & Co., T. A.
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  Inglis, John
  Jenckes Machine Co.
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  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Turner & Sons, J. J.
  Woods Limited
  Waterous Engine Works Co.

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  Hunt & Co., Robt. W.

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It specifies the kind of felt and pitch that should be used, the quantity required, and it further defines the correct method of applying same. It also specifies a simple and practical method of inspection and provides for the identifying of the pitch and felt.

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[illegible] Company
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[illegible] Company
[illegible] 112
[illegible] & [illegible] Co. 96
[illegible] & [illegible] 2
[illegible] Works 23
[illegible] Company 100
[illegible] & [illegible] 22
[illegible] Co. 88
[illegible] C. 108
[illegible] Manufacturing Company 111
[illegible] & [illegible] 88
[illegible] & [illegible] Co. 96

[illegible] Limited
[illegible]
[illegible] & [illegible] M. 34
[illegible] Limited 22
[illegible] R[illegible]
[illegible]tone Machinery Company 111
[illegible]man & Connor 108
[illegible] & Company [illegible] 102
[illegible] Company
[illegible] 107
[illegible]n Hoisting Machinery Company
[illegible] Company 102
Brodie & Company, James
[illegible] & [illegible] Manufacturing Company 97

Cabot Incorporated, Samuel 111
Campbell, R. 108
Canada Cement Company 3
Canada Foundry Company, Limited 99
Canada Iron Corporation Limited 107
Canada Lifting Jack Company
Canada Steel Company 27
Canada Wire & Cable Company 27
Canada Wire & Iron Goods Co. 84
Canadian Boving Company 28
Canadian Bridge Company 104
Canadian Buffalo Forge Company 114
Canadian Fairbanks-Morse Co., Ltd. 40
Canadian H. W. Johns-Manville Co.
Canadian Kellogg Company 41
Canadian Mineral Rubber Company 14
Canadian Office School Furniture Co. 113
Canadian Pipe Company, Limited 87
Canadian Ingersoll-Rand Company 24
Canadian Supply Company
Ceresit Waterproofing Company
Chain Belt Company 100
Chipman & Power 108
Christie Henderson & Company 96
Clapham & Sons, John 90
Cleveland & Erie Machinery Company 113
Commercial, The
[illegible] Company Limited 107
Consolidated Stone Company 98
[illegible] Plate Glass Company
Contractors' Supply Co., Ltd. 102
[illegible] 100
Corinthian Stone Company 31
[illegible] Company
[illegible] Limited 95

Dahlstrom Metallic Door Company 93
Dake Engine Company 107
Dennis Wire & Iron Works Company 87
DesMoines Bridge & Iron Company 105
Dickson Bridge Works
Dikeman Surveyor Company 108
Dominion Bridge Company 104
Dominion Concrete Company 86
Dominion Creosoting Company 32
Dominion Ornamental Iron Company 19
Dominion Marble Company 21
Dominion Sewer Pipe Company 20
Dominion Steel Castings Company 26
Dominion Wood Pipe Co. 82
Don Valley Brick Works 7
Doty Marine Engine & Boiler Co. 12
Douglas-Milligan Company

Elaterite Paint Company 88
Engineering Works of Canada
Erie Machine Shops 90
Escher Wyss
Estimators & Quantity Experts 101

Factory Products Limited 41
Farmer, John T. 108
Ferguson, H. S. 108
Foundation Company
Fraser, E. M. 108
Fuce & Scott 108

Galt Engineering Company, John 108
Galt Stove & Furnace Company 86
Garlock Packing Company
Gartshore, John J. 113
Gartshore-Thompson Pipe & Foundry Co. 106
Gaudry & Company, L. H. 90
General Supply Company 28
Goodyear Tire & Rubber Co. of Canada, Ltd. 39
Greening Wire Company, Limited, B. 112
Gurley, W. & L. 97

Hagersville Contracting Company 13
Hancock, Jr., H. Syd. 108
Hamilton Art Glass Co., Ltd. 88
Hamilton Bridge Co. 38
Hamilton Mfg. Company, Wm. 21
Hamilton Pressed Brick Company 35
Harvey, J. 113
Heinicke Company, H. R. 21
Hepburn, John T. 25
Hobbs Manufacturing Company 103
Hopkins & Company, F. H. 116
Hotchkiss Lock Metal Form Company 95
Hunter Bridge & Boiler Company 105
Hunt & Company, Robert W. 108
Hynes, W. J. 20

Improved Equipment Company
Imperial Wire & Cable Company 115
Inglis Company, John 83
International Marine Signal Co. 18-96

Jamieson Lime Company
Jenckes Machine Company 2
Johnson, A. H. 98

Kennedy, James C. 108
Kerr Engine Company, Limited 109
Korting & Greene 108

Laurentian Granite Company 113
Laurie & Lamb 1
Lautz Company
Lea, R. S. 108
Lecky & Collis 17
Leonard & Sons, E. 95
Linde British Refrigeration Company
London Concrete Machinery Company 9
Lundy Shovel & Tool Company 84
Luxfer Prism Company 91

MacLean Daily Reports
Mahan & Company
Marsh & Henthorn, Limited 86
McCoy Company, Henry J. 22
McDougall Caledonian Iron Works Co., John 85
McDowal, R. 108
McKinnon Holmes & Company
McMillan & Son, W.
McNeil & Company, William P. 106
Meadows, George B. 41
Metallic Roofing Company 87
Metropolitan Paving Brick Co. 23
Miller & Company, Geo. M. 113
Missisquoi Marble Co., Ltd. 96
Mitchell Company, Limited, Robert 104
Montreal Locomotive Works Limited 95
Morrison & Company, T. A. 108
Munderloh & Company, Limited 92
Mussens Limited 4
Myers, Oakley 95

Napanee Iron Works 17
National Bridge Company of Canada 105
National Iron Works Limited 107
National Pipe & Foundry Company 106
Neptune Meter Company 18
Noble, Clarence W. 85
Northwestern Terra Cotta Company 101

Ontario Asphalt Block Co., Ltd. 110
Ontario Sewer Pipe Company 20
Ontario Wind Engine & Pump Co. 95
Ormsby Limited, A. B. 40
Oshawa Interior Fittings Company 100
Owen Sound Iron Works 94

Pacific Coast Pipe Company 1
Paterson Manufacturing Company 15-89
Phoenix Bridge Company 101
Piggott & Company, Thomas 98
Pinchin, Johnson & Company 114
Power & Son 113
Provincial Steel Company 26

Queenstown Quarry Company 107

Reid & Brown 108
Rhodes Curry Company, Limited 88
"R.I.W." Damp Resisting Paint Co. 19
Rogers, Limited, Alfred 11
Roman Stone Company 30
Royce Limited

Sackville Freestone Company, Limited 34
Sand & Supplies Limited 106
Sarnia Bridge Company, Limited 105
Sawyer Belting Company 13
Sheldons Limited 18
Sheppard, James
Silcox, A. B. 90
Slack & Company, T. 113
Smart-Turner Machine Company 1
Smith, Limited, Thos. & Wm.
Smyth & Ryan 101
Standard Ideal Company 42
Standard Steel Construction Co. 105
Standard Underground Cable Co. of Canada. 33
Stanley Company, W. F.
Star Expansion Bolt Company 21
Steel Company of Canada 26
Steel & Radiation 8
Stinson-Reeb Builders' Supply Co. 42
Structural Steel Company 104
Sturtevant, B. F. & Company 27

Taylor, J. & J. 90
Thew-Automatic Shovel Company 23
Toledo Wheelbarrow Company 98
Toronto Plate Glass Importing Co. 1-101
Toronto Iron Works 110
Trussed Concrete Steel Company 102
Tuec Company 115
Turner, C. A. P. 91

United States Steel Products Co. 29
United Typewriter
Urschel-Bates Valve Bag Company

Waterous Engine Works Company 92
Weeks, Arthur L. 108
Welch & Company, H. J. 108
Western Canada Contractor 102
Western Wheeled Scraper Company 13
Wettlaufer Bros. 10
Whitehead & Company, Ltd., John
Woodstock Wind Motor Company 103
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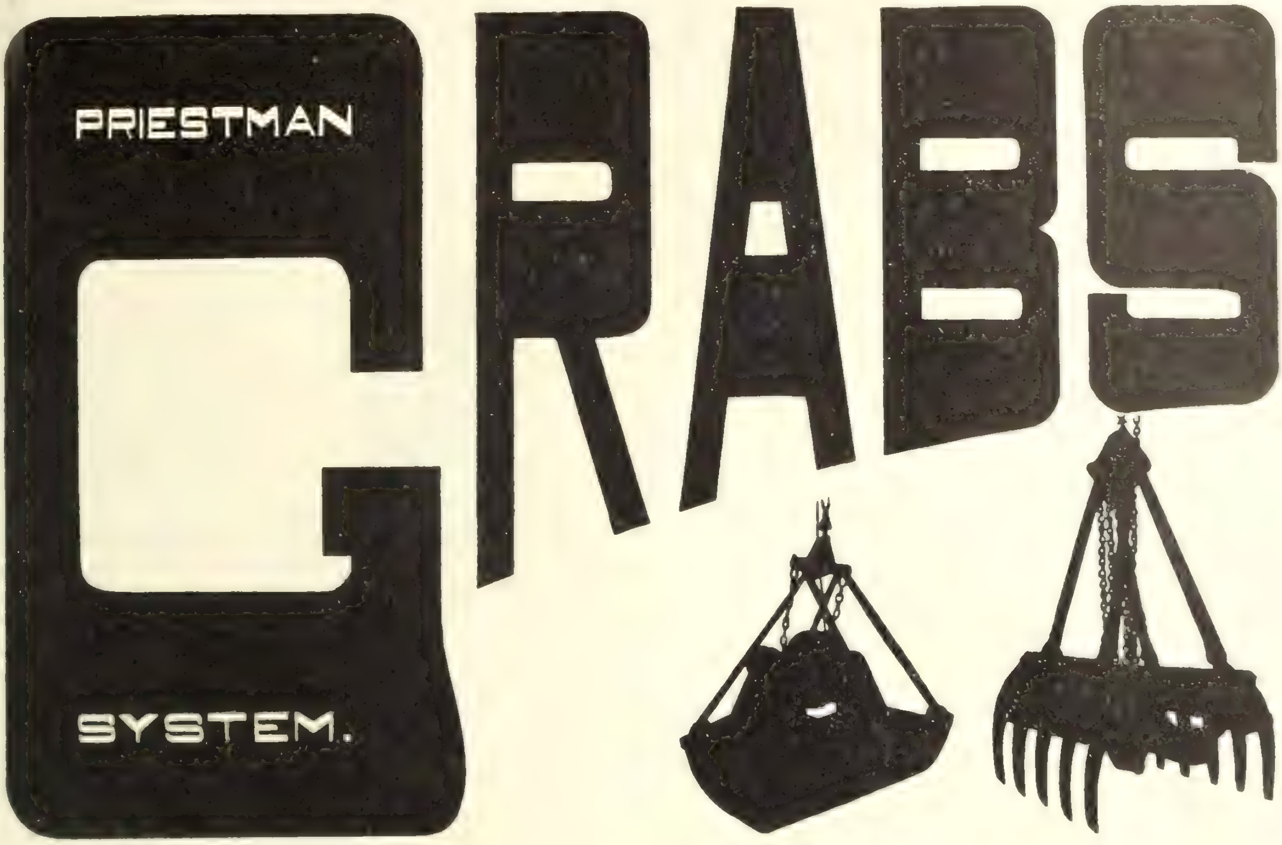

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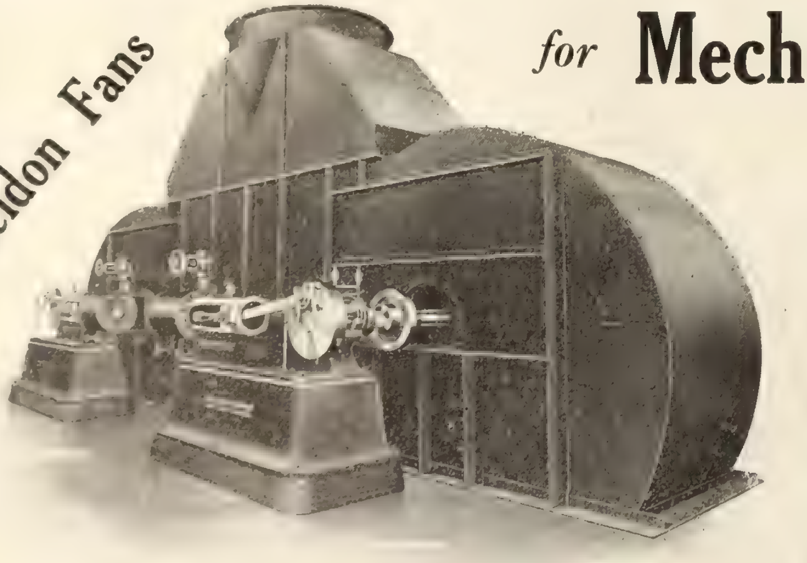

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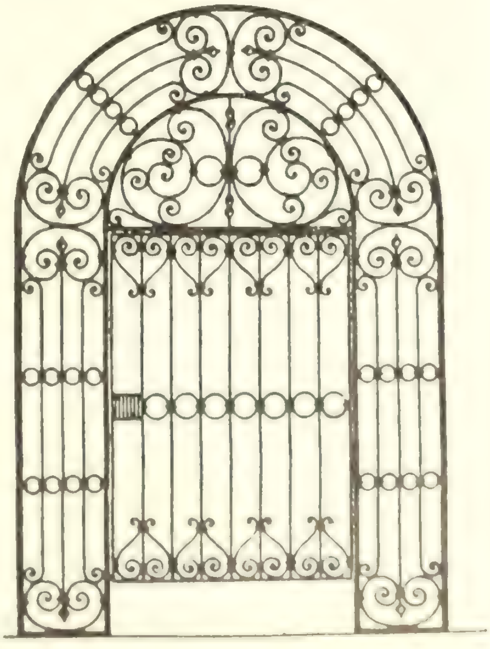

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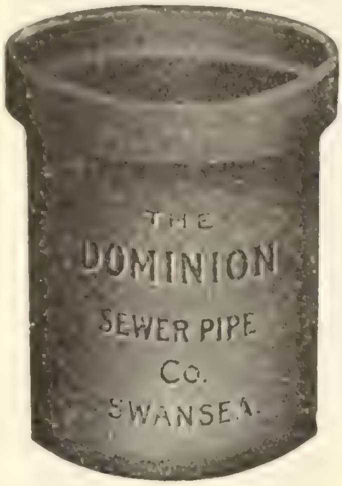

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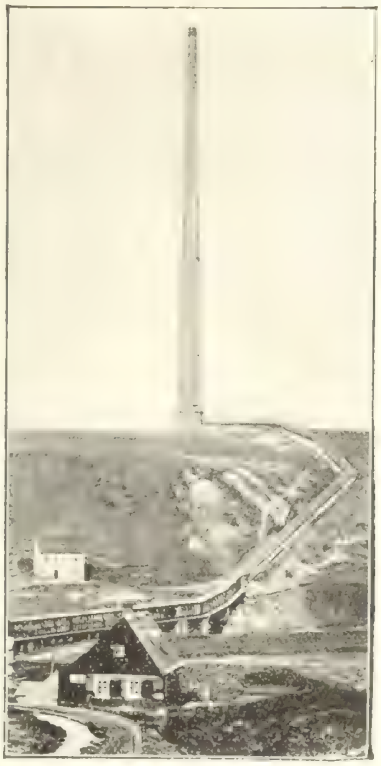

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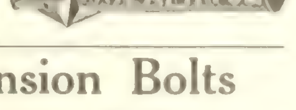
Sebco Products may be had from dealers everywhere; they are made of malleable iron, brass and of lead composition; in all sizes from 1/8" to 2" in diameter.

Sebco is specified on much Government work and by the most prominent Architects and Engineers.

We also manufacture a complete line Toggles, Concrete Inserts Drills and other fastening devices.



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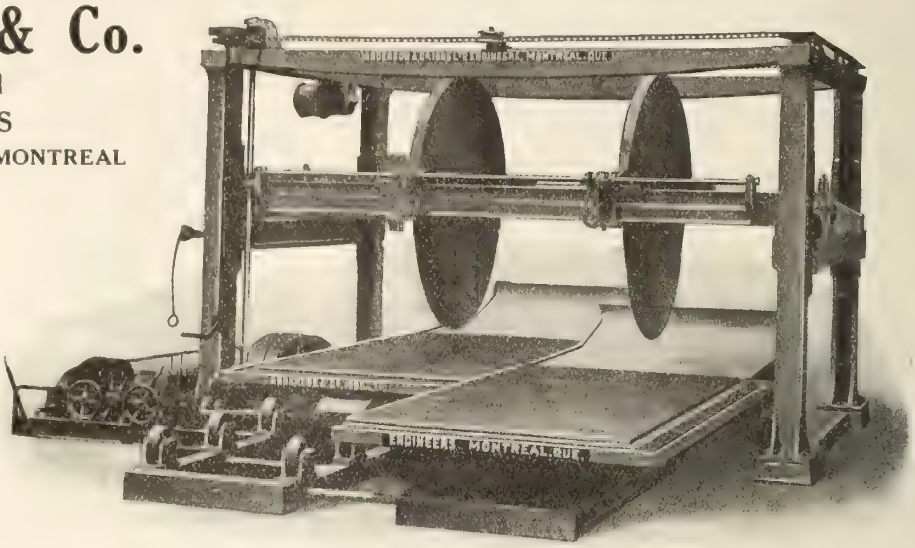

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Canadian Made Steel Dump Cars

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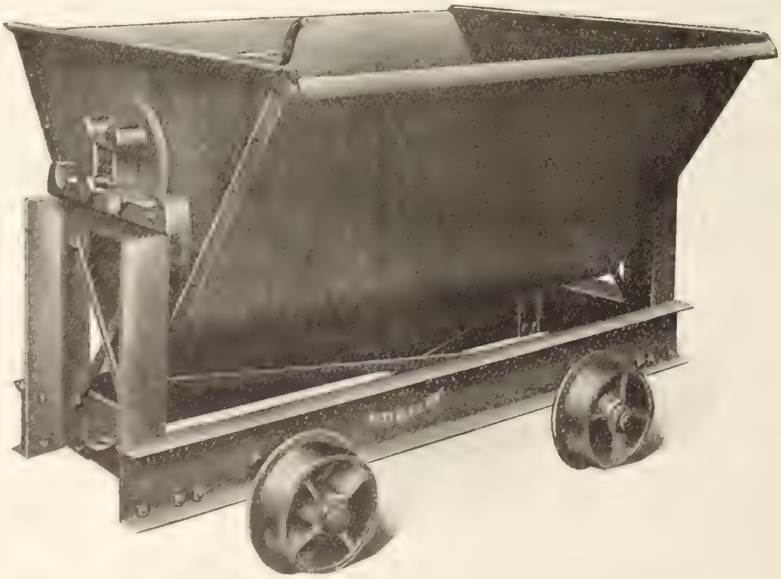

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The general use of the Thew Shovel in road building and street grading is conclusive proof that it is adapted to the conditions, economical for the purpose and efficient in operation. The following list of some of the contractors, in the State of New York alone, who have used and are using The Thew No. O Full Circle Swing Shovel in this class of excavation will indicate the popularity of the machine and its undisputed merit on such work :

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The Thew Shovel is popular because it can do the work.

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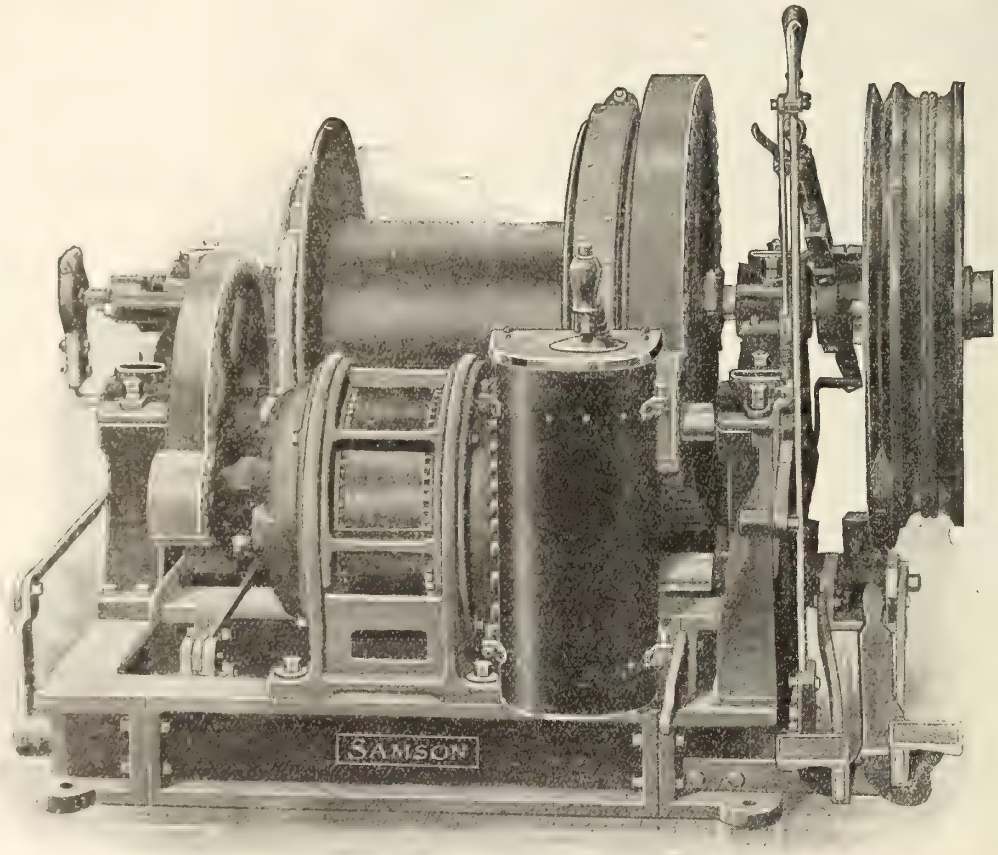

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Electric Hoisting Engines save the wages of one man.

They save power because power is only used while actually hoisting.

They also do away with coal, water, boiler and smoke troubles.

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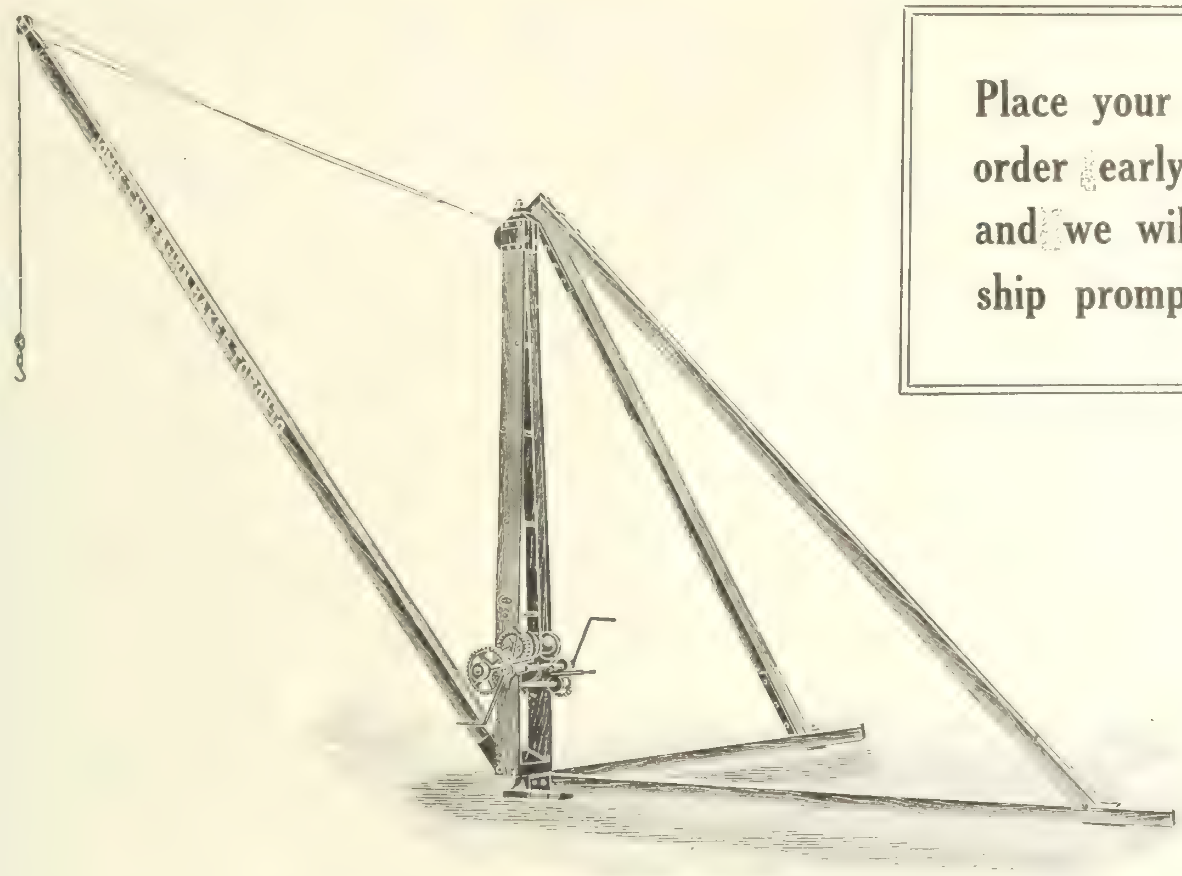

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If you cut the time upon a job and still do the job right, you are time and money in pocket. When you reduce labor by better methods and better equipment you also save time—and save money. You can get through more work, in less time, and at a better profit.

Hepburn Derricks represent bed-rock economy in construction work equipment.

They have weight where weight is needed. They have great strength. Yet every part is so well proportioned, so accurately and staunchly built, that a Hepburn Derrick is more easily operated and will do more work than any other derrick on the market.

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Made in standard sizes—one-half ton upwards. Interchangeable parts kept in stock for prompt shipment. Operated by hand or power. Fitted with single and double-purchase gears, band brake, and high-grade wire heaving rope. Interchangeable parts always in stock.

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25 " " "
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75 Tons 25 lb. Rails, Ready for Shipment
275 " 30 " " "

We hold stocks of
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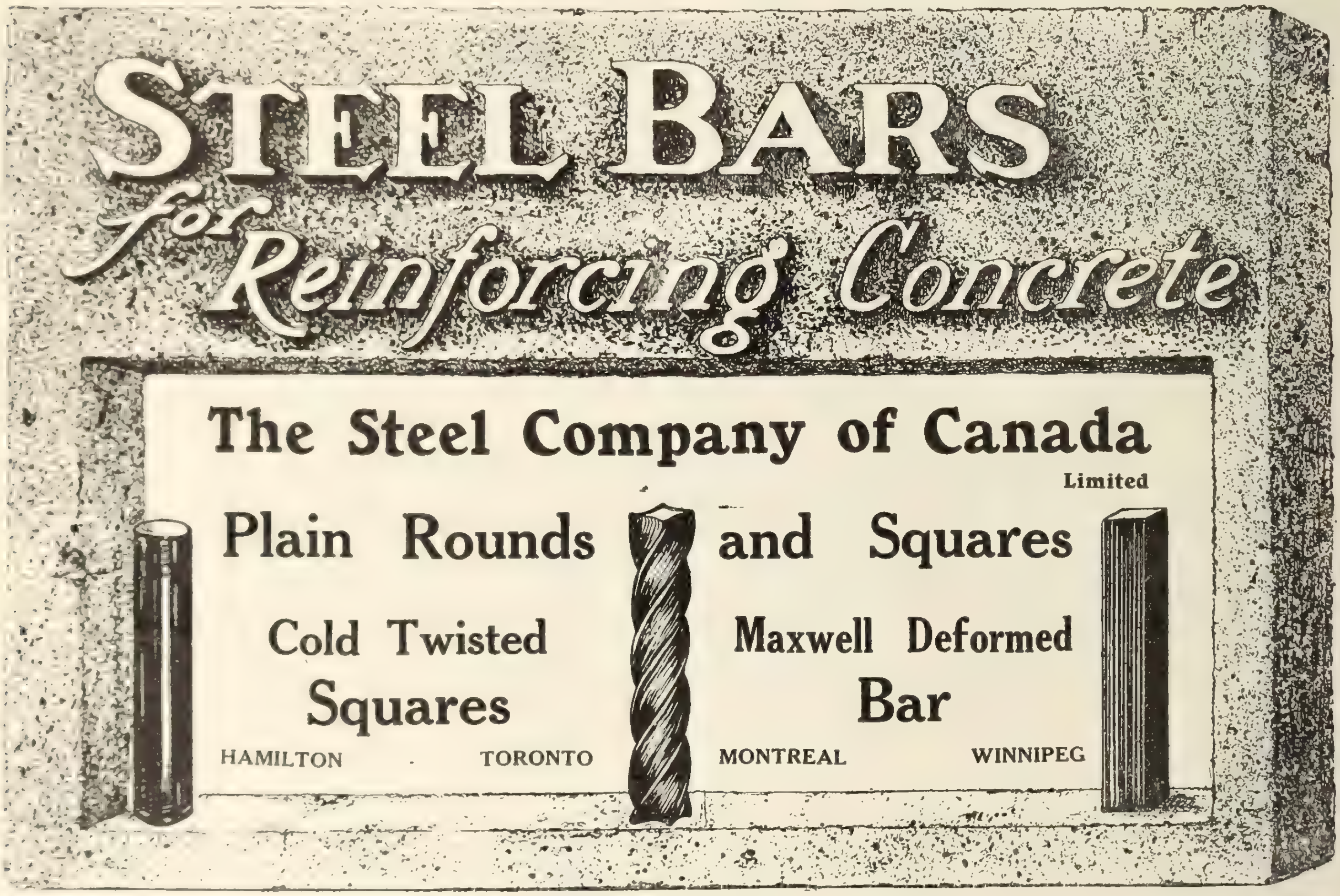

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Annual Capacity 12,000 Tons

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They will quickly change the air in factories, workrooms, kitchens, billiard halls, etc., carrying away the smoke, fumes, hot air, keeping the atmosphere sweet and cool.

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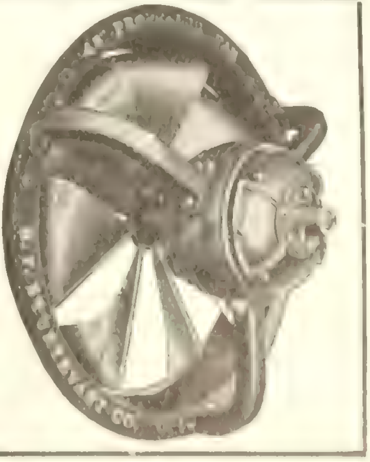

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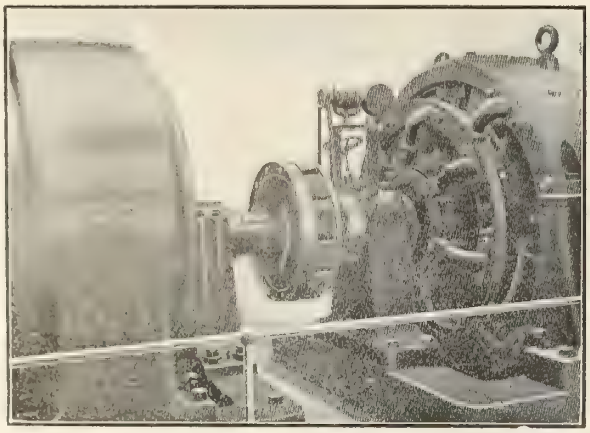

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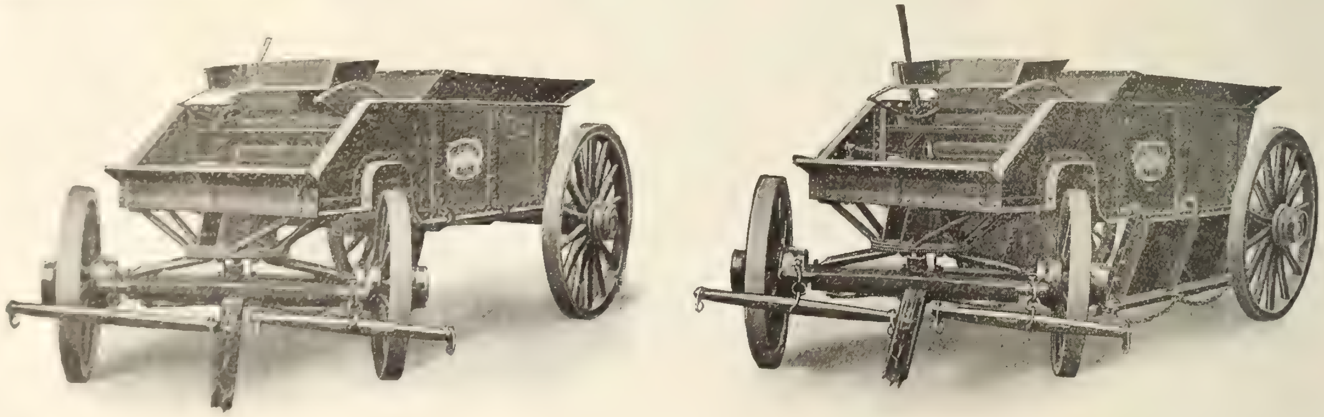

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are the latest development in Dump Waggons, and the original cost is no higher than inferior makes.

Strong, light, everlasting, first cost is last cost.

Let us demonstrate the superiority of this Dump Waggon over all others.

The General Supply Company of Canada, Ltd.

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TRIANGLE MESH
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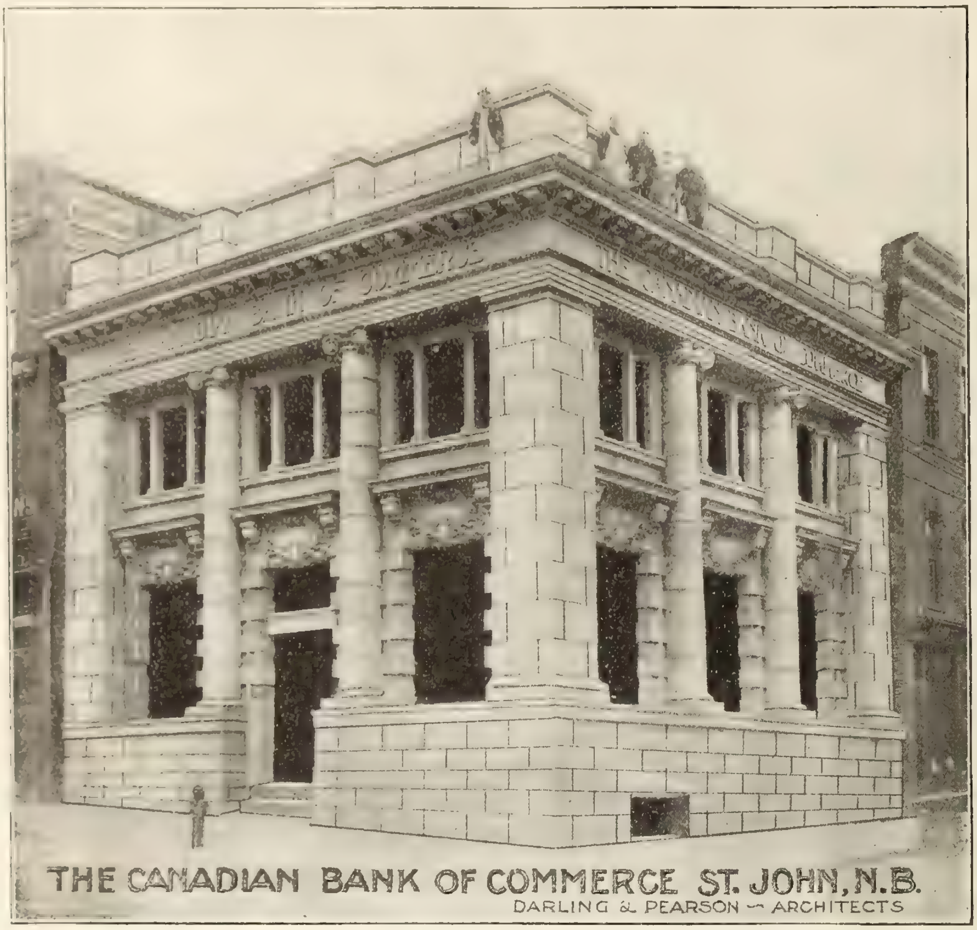

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is rapidly replacing imported Natural Stone for the highest class of buildings. It costs less and looks and lasts as well.

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The first Creosoted Wood Block Pavement laid in America was on Tremont Street, Boston, Massachusetts, twelve years ago.

This pavement was laid to secure a test of the wearing qualities of Wood Block.

The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

The Asphalt was taken up some time ago and street newly paved.

The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

The Dominion Creosoting Co., Ltd.
Vancouver, B. C.

Announcement
of the
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WE take this opportunity to wish you a Happy and Prosperous New Year and to thank you for the generous support which you have accorded us during the first eight months of our manufacturing experience in the Dominion, in the shape of substantial orders.

The steady increase and aggregate value of these orders is, we believe, conclusive indorsement of our policy of *high quality* and *fair dealing* which has, for a third of a century, always been associated with "Standard" Products.

We solicit your patronage during 1913 for the following

"Standard" Products

Wire Rods
Bare Wire and Cable
Standard C. C. C. Wire
(Colonial Copper Clad)
Magnet Wire
Weatherproof Wire
Rubber Insulated Wire
Varnished Cloth Cable
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Saturated Paper Leaded Cable
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Armored Cable
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"Ozite" Insulating Compounds
Insulating Tapes and Sheets
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Cable Hangers and Supports
Cable Installations

Detailed information, samples, estimates or prices cheerfully furnished in regard to any of the products in the above list which is only an outline of our complete list.

Our engineers have had long experience in the installation of cable systems of all kinds and they will gladly advise you regarding your problems in this line.

Standard Underground Cable Co., of Canada, Limited
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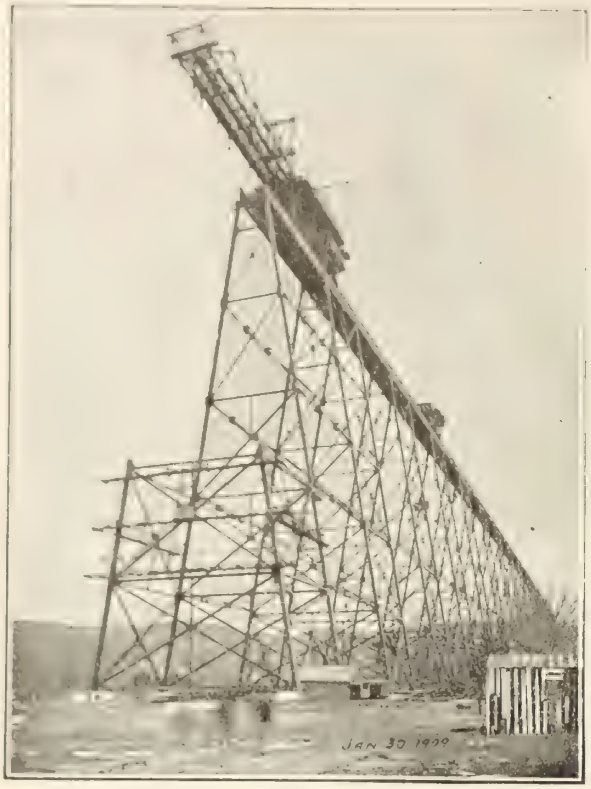

Outlook Bridge on the C. P. R. built by the Canadian Bridge Company who in common with the other large bridge builders have found Beatty Hoists thoroughly reliable for this trying service.

"Beatty Hoists"

STEAM and ELECTRIC

Have stood the test of time and given satisfaction wherever they have been placed.

Ask the man who has one.

We have shipped Engines into almost every part of the Dominion and will gladly put you in touch with our nearest customer.

Can furnish any size or type and give prompt shipment.

We also build Dredges, Steel Scows, Centrifugal Pumps, Derricks, Derrick Irons, etc., and are sole Canadian makers of the **Williams "Faivrette" Clamshell Buckets.**

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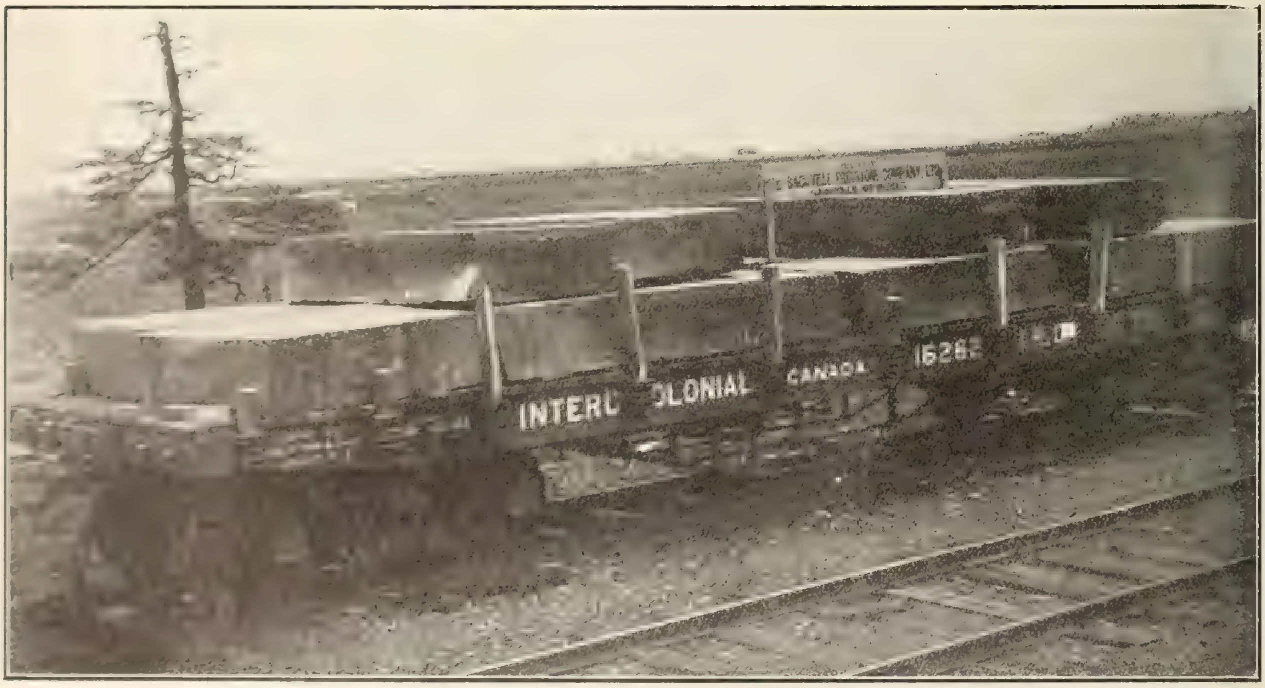

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Sackville Freestone Co., Limited, Sackville, N. B.

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[illegible] & [illegible] Architects

These fine new apartments in Toronto are being built of the popular Hamilton Red Pressed Brick

Popular, because its deep uniform red shade is always the same and never fades.

1,000,000 bricks are on hand in our yards ready for immediate shipment.

Hamilton Pressed Brick is made from shale, rich in ironoxide and free from so called soda.

It has been used in many of the leading public buildings, schools and residences throughout Canada.

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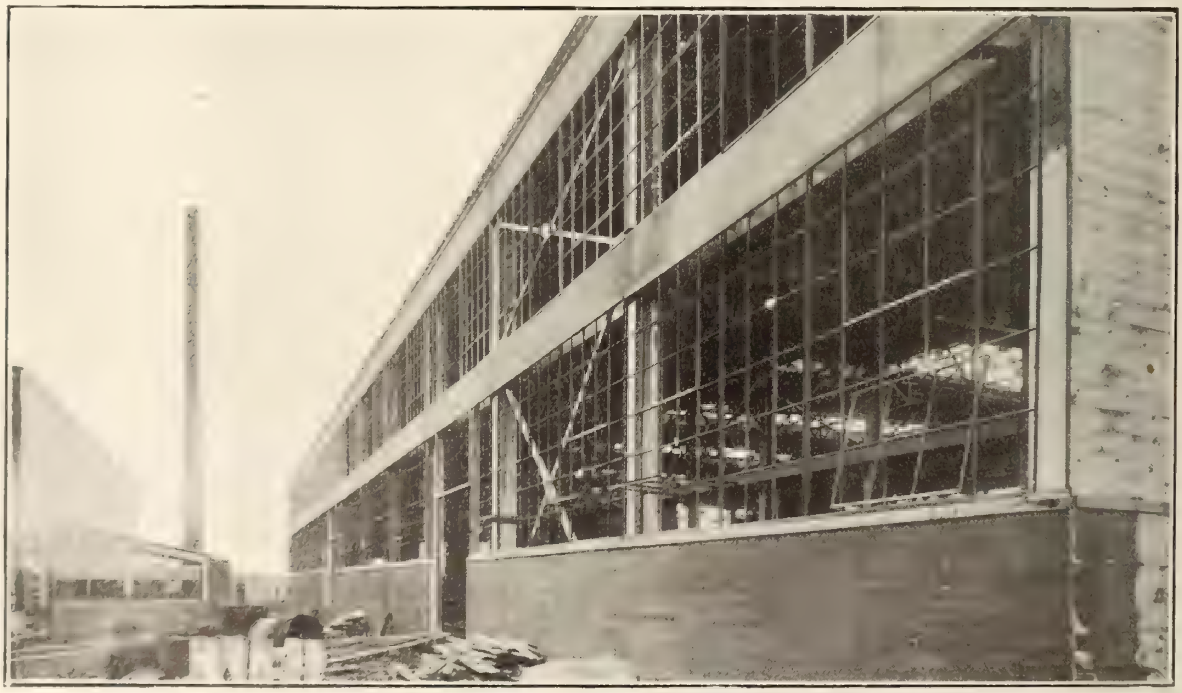
They have found that **HAMILTON,** with its Unexcelled Advantages for Manufacturers, its Great Natural Beauty, Natural Gas, Pure Water, Reasonable Cost of Living and Happy Home Surroundings, is the Ideal City for Home or Business.



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Located in Hamilton in 1912

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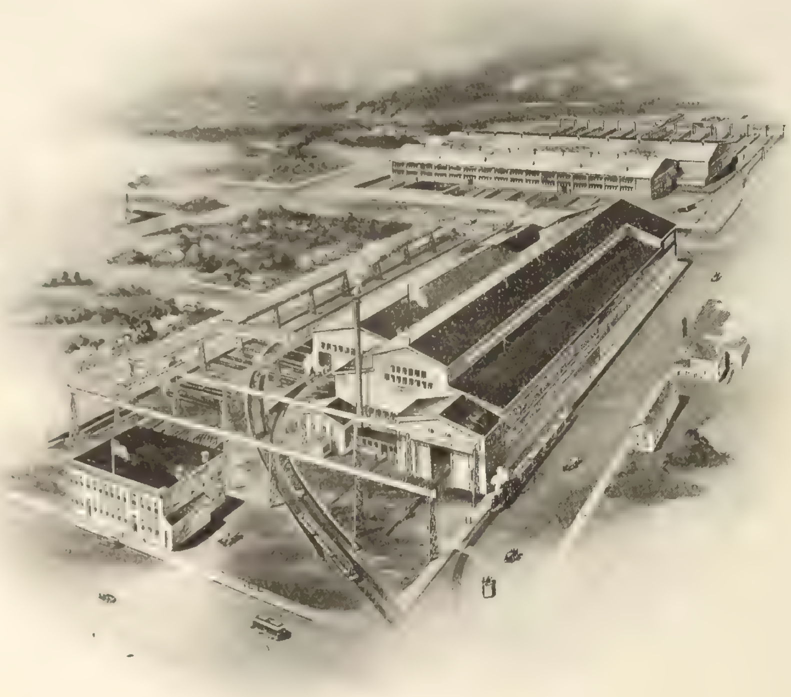

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Railway Bridges	Warehouse and
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Our capacity is 30,000 tons per year

The Hamilton Bridge Works Co.

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A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

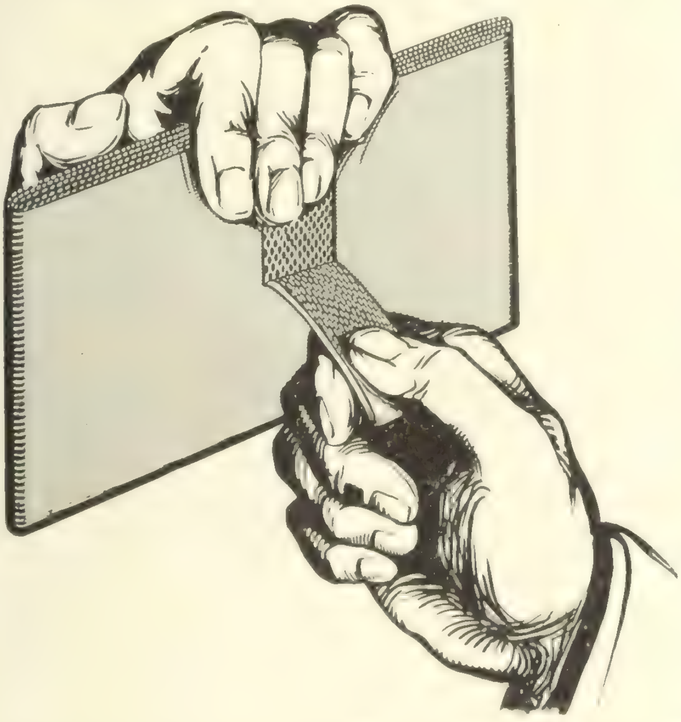
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard-twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit, and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS A TOTAL OF 72,000 FEET

We have just received an order for this quantity of GOODYEAR RUBBER BELTING [illegible] of interior elevators—such an order [illegible] of the quality of GOODYEAR Belting.

If we have not got the belt you require we will make it for you.

In the choosing of belts our booklet [illegible] We supply it free. Write to our nearest branch [illegible]

The Goodyear Tire and Rubber Company of Canada, Limited

Factory, Bowmanville, Canada

BRANCHES: Victoria, B.C. Vancouver, B.C Calgary, Alta. Regina, Sask. Winnipeg Man. London, Ont.
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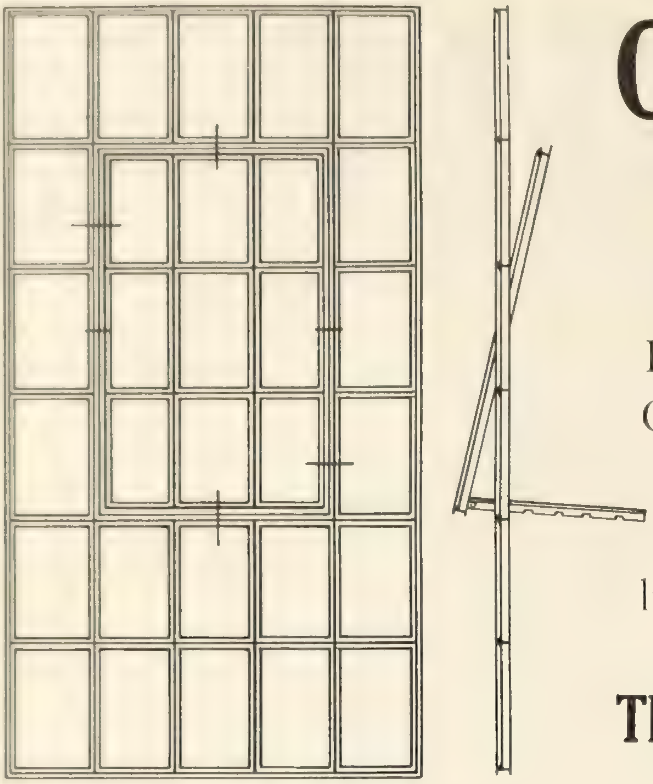

Ormsby-Lupton Steel Sash

For the Factory and Workroom ORMSBY-LUPTON STEEL SASH is recommended for maximum of light besides being absolutely weather and Fireproof.

The A. B. Ormsby Co., Limited
Toronto and Winnipeg

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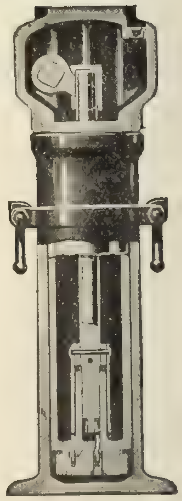
Reliability and Durability are only a Few Advantages of Forged Steel Construction



This sectional view clearly shows the remarkable simplicity of Duff-Bethlehem Design, and the absence of complicated features, as compared with other types using castings. The base and cylinder is a one-piece forging (not 2 castings screwed together with a packing at the joint). The pump socket is forged integrally with the ram bottom (all other types use 3 or more cast parts with packings at every joint). Packings—usually the most troublesome feature of Hydraulic jacks—are thus reduced to a minimum, only two being required.

Duff-Bethlehem Forged Steel Hydraulic Jacks

are made in a number of different styles, with capacities from 10 to 500 tons. They operate at any angle, horizontally as well as vertically, and one man can operate any size to its full capacity. Our Catalog No. 15 will interest you.

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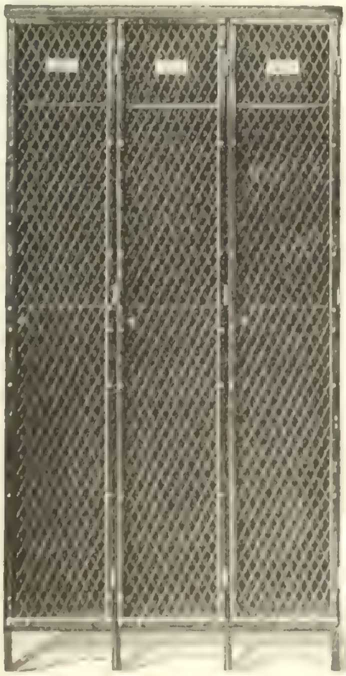

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ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY

HUGH C. MACLEAN, LIMITED

HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
VANCOUVER - Tel. Seymour 2013 - Hutchison Block
NEW YORK - Tel. 3108 Beekman - Tribune Building
CHICAGO - Graceland 3748 - 4059 Perry Street
BOSTON - - - Main 1024 - - - 643 Old South Building
LONDON, ENG. - - - 3 Regent Street, S.W.

SUBSCRIPTION RATES

Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

**Alphabetical Index of Advertisers
Page 16**

Vol. 27 January 1, 1913 No. 1

Early Engineering Experience

TO the editorial consideration of the wisdom or otherwise of specializing in engineering work Mr. E. G. Barrow, Ex-City Engineer of Hamilton, replies with a letter published in this issue. Mr. Barrow has had an extended connection with this field and his brief observations may be regarded more in the light of ripe experience than as the expression of an opinion.

While the subject of specialization has come in for a great deal of attention lately, it would seem that it were not the first consideration that should occupy the attention of the young engineer. As in other walks of life, it is the early training that counts, and so the first thought should be devoted to the line along which effort will be made.

Opinion is often divided as to the course that should be pursued by the engineering graduate:whether he should seek a position of some permanency and strive hard for advancement, or whether he should spend the first few years in roaming in search of practical experience—keeping his eye open for the opportunity which shall lift him above those who have taken the more conservative course. The matter is commented upon editorially by The Engineering Record, which remarks the contradictory nature of the problem.

If "a setting hen never gets fat," contrariwise "a rolling stone gathers no moss"; so one may take his choice of the horns of this particular dilemma without hesitation. The main thing specially worth pointing out here is that these two routes are desirable, each in accordance with the temperament of the man who seeks to follow it. Some men have a remarkable capacity for handling routine work and very little genius for adapting themselves to sudden changes. Such men readily drop into positions with a large organization, and if possessed of real capacity may win solid and enduring success. Every organization has need for at least one man who is possessed of a methodical devil and can be trusted to handle details of routine involving matters of the utmost importance systematically, promptly and successfully. He may be, and often is, quite helpless and ineffective when forced suddenly into executive responsibilities requiring large initiative and quick decision, but if one looks at the successful men in any big organization he will find, perhaps not often at the top, but frequently very near it, examples of these steady-going wheel horses, who are beloved and trusted for the absolute reliability of their work.

On the other hand, there are men of the highest capacity who are not at their best, and in fact generally at their worst, in steady-going team work. They are pioneers by temperament, sometimes too prone to rapid changes of base, but always liable to make a brilliant success from the very qualities of resourcefulness and decision that make them chafe under routine. From this class are generally recruited the men at the very top of every profession, and also a great group of uneasy drifting spirits, who are sidetracked at various points along the way in virtue of their own too great instability.

These two classes represent two types of human capability, each necessary to the world's work. To each of them hard work is a necessary prerequisite for success, but a great deal more than hard work and capacity is necessary in order to get on in engineering or any other profession. Equally important are preparation for advancement and the opportunity of getting it. Advancement generally does not come to him who is unready for it, but it is equally rare for it to come to one who is out of the immediate line which leads to it. The man in a big company very often finds himself in a cul-de-sac from which there is no emergence, while on the other hand the man who knocks about, following the other line of advance, may back out unwittingly from desirable opportunity. The best advice that can be given to the young engineer is not to be afraid of hard work or roughing it in the early stages of his career, and never to lose sight of a clear path upward when it presents itself. If a change of base is necessary it should be made unhesitatingly, for dogged persistence that merely butts its head against a stone wall is not a praiseworthy trait. On the whole, during the early part of an engineering career getting into a cul-de-sac is a greater danger than that incurred in drifting about, but after a certain amount of experience has been acquired in various allied lines of effort it is time to pick out a likely prospect and to bore away at it. And it should never be forgotten that the prizes in the engineering profession come chiefly to those who know not only the technique of their work, but its immediate bearings on the business and financial side of the enterprise in hand.

THE Canadian Pacific Railway [illegible] seven thousand miles of track, all of comparatively recent construction and some of it very new, with a great number of structures designed and supervised by its department of bridges. Much of the line is of very heavy construction. It is estimated that during 1912 about $10,000,000 was expended by the bridge department on the new and old structures. A large amount of bridge work is still in progress and proposed, exclusive of the [illegible] and extensive constructions that will be required soon for the proposed abolition of grade crossings in Montreal. The magnitude of the bridge work is indicated by the following summary taken from the annual report of Mr. P. B. Motley, engineer of the bridge department, for the year ended June 30, 1912: At the end of the fiscal year there were in existence 3,771 bridges and open culverts. These had an aggregate length of 362,724 feet (68.69 miles). There were 25,125 culverts other than open, of which 14,032 were permanent and 11,093 of a temporary nature. During the year 778 old bridges and open culverts were replaced, aggregating 39,402 lineal feet, including 24 old iron and steel bridges, too light for present traffic, and having a total length of 2,438 lin. ft. There were 923 culverts other than open and overhead bridges replaced. New bridges to the number of 109, aggregating 12,148 lin. ft. (2.3 miles), were added. The number of temporary bridges was reduced during the year by 629, aggregating 20,588 lin. ft. (3.89 miles).

Specialization in Engineering

Editor Contract Record:

In regard to the above subject, discussed editorially in your issue of Nov. 27, 1912, I may perhaps be able to give some advice that will be useful to the numerous young men who are following—or who are about to follow the engineering profession.

I may say that at the outset of my career I was engaged on railways in England, then in locating and constructing railways in Canada, later as an Ontario land surveyor, then as a contractor for three years, and afterwards, for fifteen years, as city engineer. I now have a good general practice.

In my opinion, engineering at the present time is sufficiently specialized and should not be carried any further. Unless a man feel a special aptitude or liking for any particular branch of engineering it would be wiser for him to become a general practitioner.

To succeed as a specialist he must be an expert of experts, i.e., his knowledge of his subject must be profound, whereas one with a general knowledge of several branches of engineering, and withal a good business man, is able to fill a number of positions. With the vast progress that this country is now making the general man will have little trouble in obtaining work and is therefore more likely to have continuous employment than the specialist.

In this connection it would be interesting to know how the various members of the Canadian Society of Civil Engineers are now employed, and how many specialists there are amongst them.

Yours truly,
E. G. BARROW.

Rotary Snow Ploughs for Railroads

THE development, construction, and use of rotary snow ploughs was the subject of a paper read by Mr. H. H. Vaughan at the last monthly meeting of the Canadian Society of Civil Engineers, Montreal. Mr. Vaughan stated that the development had been chiefly due to Canadians and Canadian railways. Both in Canada and the United States the rotary snow plough had been extensively used during the past 20 years, and it had proved so far to be the only effective appliance for dealing with deep drifts and snow slides that were beyond the capacity of the wedge or ordinary snow plough. After describing the various stages through which the plough had gone, Mr. Vaughan said there had been many attempts to develop other styles of steam driving ploughs, but none had been found so powerful and efficient as the rotary, and none were in actual use to-day. Mr. Vaughan and Mr. J. Player, consulting engineer of the American Locomotive Company, in July, 1910, prepared designs for a special plough for the Canadian Pacific Railway, the object being to build a plough that practically could not break down and would cut its way through any snow bank. Mr. Vaughan believed that better results could be obtained by driving the plough wheel direct in marine engine style than through the bevel gears previously used, and that the frame of the plough should resemble a bridge girder to thoroughly support the casing or hood in place of the channel iron frame which required bracing to prevent its bending. These suggestions were adopted. The first plough was completed by the Montreal Locomotive Works on Jan. 8, 1911, and the second one a few days later—a remarkably quick piece of work in view of its size and every part being entirely new in design. These ploughs worked exceedingly well, and were so strongly constructed that it was difficult to see how any obstructions could injure them, and from the experience obtained it was expected that they would be of great assistance in keeping the road open under any conditions.

A Standard of Progress

EDITORS as a rule are not enthusiastic over annual numbers. The reader picks up the paper and, glancing over its volume of reading and advertising matter, flies to the conclusion that publishers and editors alike have things pretty much their own way, in regard to both wealth of literature and wealth of the other kind. The idea is quite fallacious. Publishers generally are men of a philanthropic turn of mind whose profits, in any case, are grossly over-estimated, while editors are of a rare genus that thrives by much hard work and few ha'pence.

In spite of their eccentricities, however, publishers and editors alike are human. We speak from the editorial standpoint when we say that the letter containing the following extract received from one of the largest U. S. firms almost overcame us. We publish the item to remind our readers that we like to hear from them. Whatever they may have to say—good or bad—it will interest us. If good, it will gratify us; if bad, it will suggest improvement.

> **"We desire to compliment you very much upon your interesting number of December 18. This is certainly an excellent magazine, well printed and containing a vast number of good illustrations and instructive reading matter. Canada must indeed be making great strides, judging from your splendid publication and its large advertising patronage."**

We appreciate the fact that Canada is making phenomenal progress. If our best efforts in the production of the Contract Record may be regarded as a standard of that progress, we shall die happy, like Wolfe.

Advantages of the Lift Span Type of Bridge

IN laying plans for the installation of a draw bridge for Hawthorne avenue, Portland, Oregon, the city officials endeavored to eliminate the many vexatious delays that were due to the constant opening and closing of the old draw span type Madison Street bridge which formerly occupied approximately the same location as the present structure.

After looking over the various types offered, they finally decided on the lift span type as being the one which would most effectively alleviate these conditions. This has been justified on the part of the city officials, as the time required to raise the bridge to the top of the span and lower it is less than that required to swing open the draw span type. The lift span type, however, possesses an additional advantage in that it is unnecessary in most cases to raise the span more than a few feet to accommodate the greater bulk of the river traffic, and consequently the delays to traffic across this bridge have been reduced to a minimum.

This type of span resolves itself, from an operating standpoint, into practically an elevator proposition, the weight of the span being balanced by means of steel cables operating over sheaves located at the top of the towers on either side of the span. These counterweights are clearly shown in their position in Figs. 1 and 2.

The bridge is operated by means of two 125 h.p. 550-volt, direct current railway crane type motors, which are directly coupled to a train of gears located in the machinery house on the top of the span. This reduction gearing, in turn, operates the bridge by means of steel cables. The lift span is guided in raising or lowering, by means of steel roller bearings operating in the guides located in the vertical uprights of the towers.

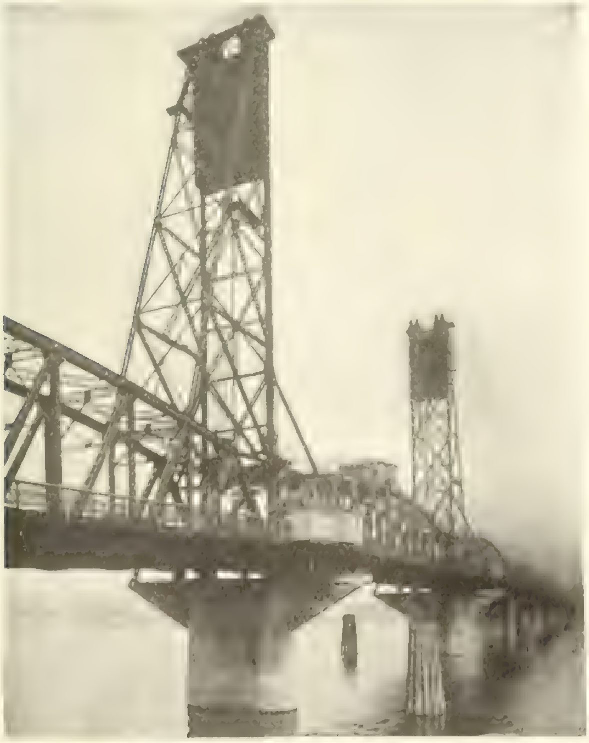


Fig. 1—Hawthorne Avenue bridge

Besides greater speed in operation and consequently less delay to the traffic, this type of bridge also presents three great advantages from an engineering standpoint: 1st—There is no unequal expansion or contraction, due to the effect of the sun's rays, as would be the case with the draw span type pivoted in the centre; 2nd—the wind friction is practically negligible; 3rd—it offers the use of the entire channel.

The bridge was designed by Messrs. Waddel & Harrington, consulting engineers, Kansas City, Mo., well known as the designers of much of the most important bridge work carried out in Western Canada of recent years.

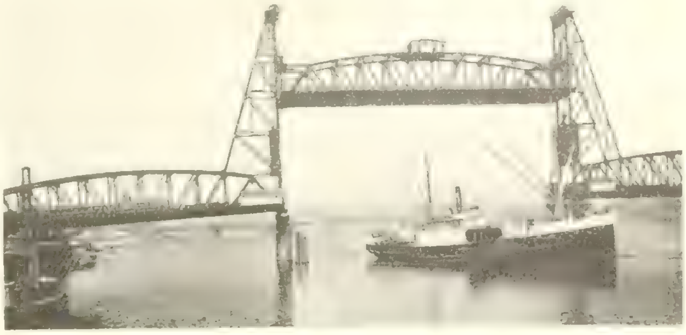


Fig. 2—Hawthorne Avenue bridge—Lift span raised

Two Methods of Treating Concrete and Reinforced Concrete

An article in a recent issue of "Le Ciment," the leading paper devoted to Portland cement, is of interest in showing the cleverness with which French writers draw interesting comparisons from general topics. The article follows:

We have noted in our foreign exchanges two types of construction well calculated to show two opposite methods of treating the architectural side of construction in concrete and in reinforced concrete.

One is graceful from the point of view of the architect and the other is simple, but at the same time imposing, from the point of view of the engineer.

The first construction is an observation tower erected on the road from Dresden to a neighboring watering place, known as Weisser Hirsch, in order to give a view of a park belonging to the first named city. It replaced a wooden tower whose height of 6 m. became too low as a result of the growth of trees in the neighborhood. An engineer in the city of Dresden, Professor Erlwein, who had the matter in charge, designed the construction in reinforced concrete, to which he was able to give an artistic appearance of the highest order. The base is 8-sided, the shaft cylindrical and the capital had 12 sides, surmounted by a cupola. Two platforms are provided; the first at 4.80 m. from the ground, the second 16.30 m. The total height to the point of the lightning rod is [illegible] m. Concrete foundations rest upon rock which is found at a distance of more than a metre below ground. This concrete is composed of 1 part of cement to 6 of sand and 8 of broken stone, or only 5 of sand and 7 of broken stone.

The cylindrical portion, with its 14 half-circular columns of reinforced concrete set 1.50 m. center to center, narrowing at the top and crowned by circular arches, is the portion that presented the greatest difficulty in construction, since it was not possible to make use of wooden centering without [illegible] on the platform or [illegible] the mast.

The second work, of which only a brief description is given, is a grain elevator at Montreal [illegible] practical use does not demand architectural treatment. Although the engineer who designed the building did not have the architectural appearance of the building in mind, it is well known that reinforced concrete of itself produces a somewhat aesthetic effect, if only by the simplicity and dignity of its lines. With its towers rising from the [illegible] figure of the whole, the construction recalls that of the mansions with superimposed terraces which are observed in certain Italian cities.

This elevator was constructed entirely in reinforced concrete by the John S. Metcalf Co., Montreal. Several elevators of the same kind are in construction and will be completed in three years.

New Grain Elevator at St. John, N. B.

When the John S. Metcalf Company, Limited, of Montreal, set out in August last to erect at West St. John a new grain elevator of one million bushels capacity for the Canadian Pacific Railway Company, they were confronted with conditions which are exceptional owing to the great rise and fall of the tides in the harbor. The elevator building is to be about 100 x 200 ft. in dimensions. It is to be a modern concrete elevator, exclusively for export purposes, and will contain eight legs which will be used for receiving and shipping grain. It will be possible to unload sixteen cars at a time. There will be four tracks through the house, and there will be a large number of bins to facilitate the handling and distribution of various grades and kinds of grain. The foundation will be of reinforced concrete, with spread footings resting on bed rock. The first floor columns, bin slab and bin walls will be of reinforced concrete. The cupola will be of structural steel construction, covered with corrugated iron, and the floors and roof will be of concrete. The new elevator will be connected by a system of galleries with the present Canadian Pacific Railway elevator, and will work in connection with the present system which distributes grain from that elevator to the vessels lying in the various slips where steamships are berthed.

On account of the rise and fall of tide, which has an average variation of more than 20 ft., the new elevator is located at about mean tide. This causes the foundation to be covered twice a day with 12 to 14 ft. of water and the company have been compelled to work 6 hour shifts between tides. In order to get a good foundation they had to go down to bed rock, and the borings show it to vary from 6 to 16 ft. The formation of the rock is very irregular, and in a large number of instances presents a sloping bed. Sometimes an angle of 30 degrees was found. In such cases it was necessary to blast off in order to secure a level footing. The deposit of earth over the bed rock consists of from one to two feet of sand, from 6 ft. to 12 ft. of stiff clay, and generally overlaying the rock 18 in. to 2 ft. of hard pan. A large number of boulders have also been encountered.

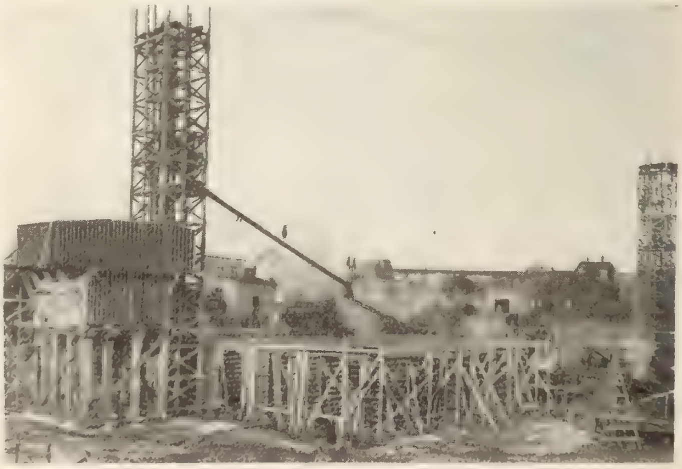
In order to treat this foundation in as economical a way as possible, it was deemed advisable to sink the excavation by the aid of sheet piling and to do the work by hand excavation. Because the foundation is covered by each raise of tide, a great amount of pumping has been necessary to clear the water. To provide for this a large steam plant has been erected, operating centrifugal pumps, one of which is used for pumping the excavation and the second to supply the water used to sluice the excavated material to the east side of the elevator, whence it would flow down the beach and out of the way. To take care of the seepage, pulsometers have been used and also steam jets. In order to further facilitate the pumping out of the holes, a large float of timber work, made buoyant with barrels, was built and on it was installed a 6 in. belt-driven centrifugal pump operated by an engine.

The concrete has been placed by means of a mixer installed on a scow, and this facilitates the work of reaching each individual line of piers as the work progresses.

For placing the concrete above the ground level, two mixer plants were installed in connection with towers. These will deliver the concrete to the various portions of the building by means of a spouting system.

All the forming is cut out in a mill that is adequate for all the purposes of a job of this magnitude. The mill is electrically operated and contains one cut-off saw, bench saw, joiner, cylinder planer, bandsaw and boring machine. There is being installed a conveyor system for handling sand and gravel from the stock pile direct to the mixing plants, a small storage bin being erected over each mixer of sufficient capacity to afford at least a half day's run for each mixing plant.

Site of new C.P.R. elevator at St. John



Recent view of foundation work

The material can be easily spouted from the storage bin directly into the charging hopper of the mixer.

Ample cement storage has been provided along the Canadian Pacific Railway tracks and the cement is unloaded into a chute which delivers directly into the cement shed. All other necessary buildings, such as offices, store-room, tool-house, oil-house, timekeeper's office, etc., for the conduct of the business, have been built. On account of a scarcity of boarding-houses at West St. John, the company found it necessary to erect a boarding-house for 140 men. It is two storeys high, with dining-room and kitchen on the first floor and sleeping apartments above. Ample provision has been made for storing all necessary supplies.

The new elevator will be electrically operated and supplied with power generated at the site by means of turbine engines. It is understood that the power and electrical equipment will be in duplicate.

Work was begun in August and the elevator will be handling grain next fall. Mr. J. K. Wyman is the local superintendent for the John S. Metcalf Co. Ltd. The general superintendent, Mr. F. R. Hodge, is also devoting considerable time to this job. The company is now building harbor elevator No. 2 at Montreal, a large roundhouse and water works for the Grand Trunk at St. Lambert, a large freight house for the Grand Trunk at Point St. Charles, and has recently completed a 2-million bushel addition to the Canadian Pacific Railway elevator at Port McNicoll, Ont. They are also constructing at Port McNicoll between 1,000 and 1,500 ft. of docks. They have been at Port McNicoll since 1909, having built there nearly a mile of docks and also the present Canadian Pacific Railway elevator and freight sheds. They are also completing a 2,500,000 bushel addition to the Grand Trunk Pacific elevator at Fort William.

Temperature and Ventilation as Efficiency Factors in Mills

THE growth of efficiency systems in industrial work has called increased attention to the influence that an adequate supply of fresh air exerts in increasing the efficiency of the operatives. The importance of this was emphasized by Prof. C-E. A. Winslow, of the College of the City of New York, in an address at the National Conference on Industrial Diseases held at Atlantic City.

The main factor tending to render the air of confined places harmful, aside from the special problems presented by dust and fumes, is overheating, especially when combined with excessive moisture. The action of hot dry air is debatable and the physiological effects of odors in air have not as yet been clearly shown. In the matter of temperature, however, Professor Winslow states that the workers in a factory where the temperature is over 70 deg. Fahr, are injured by a lowering of vitality that may lead to tuberculosis and other serious diseases. Moreover, they are working below their normal standard of efficiency, so that both they and their employers are the losers.

The report of the New York State Department of Labor, which, it is stated, is the only official body in this country which carries out examinations of factory air at stated intervals and publishes the results, shows that out of 215 workrooms examined at seasons when the outdoor temperature was 70 deg. or less, 73 per cent. of these had temperatures of 73 deg. or over and 27 per cent. had temperatures of 80 deg. or over.

Prevention of Overheating

The method of preventing overheating in such buildings is by mechanically changing the air by some system of ventilation. This involves the removal of the overheated air and its replacement by cooler air from without. The best results are obtained when the latter is first tempered by raising it to a point a little below that which is normally felt to be comfortable. Under factory conditions, incoming air much below 60 deg. would cause discomfort to operatives and would not be compatible with efficiency in the majority of trades which call for manual dexterity.

Many sanitarians maintain that changes in temperatures are stimulating and beneficial, and this has been found to be the case in schools, where the spirits and efficiency of the pupils have been benefited by frequently admitting the outer air. It is suggested that in many industrial processes the benefits to be derived from such a procedure might even warrant the temporary interruption of work. All such measures are, however, merely modifications of a general system of air conditioning and do not constitute separate systems. The fundamental problem is the exhaustion of the hot air of the workroom and the supply of cool but tempered air to take its place. In Professor Winslow's opinion the hot air should be taken out near the top of the room and the cool air admitted near the bottom. This may be attained by allowing the hot air to escape by its own tendency to rise, or the action may be stimulated by the use of fans. Also, the cool air may be admitted to the room at window openings equipped with tempering coils, or it may be forced in from a central point through special ducts. The method best adapted to secure the desired results depends largely upon local conditions.

Factory Ventilation Laws

Professor Winslow calls attention to the fact that with the exception of the 1909 law of Illinois there are at present only two types of laws in statute books of the various states governing the question of factory ventilation. Of these, eight or ten states provide for a minimum cubic space per occupant, usually 250 or 400 cu. ft. Some twenty states require that factories shall be "ventilated" or "well ventilated" or "sufficiently ventilated." The space requirement per occupant by no means insures good air conditions; it merely prohibits such a state of overcrowding that proper air conditions are impossible. Whether a factory with ample air space per occupant is comfortable or not depends on what provision is made for air change.

Recent studies have shown that the air space per occupant is not the essential factor, conditions having been found in factories with over 5,000 cubic feet of air per occupant which were no better on the average than those in which only 300 cubic feet were provided. In Professor Winslow's opinion the Illinois law is the only real ventilation law in the United States. This provides that a definite amount of air, 1,500 to 1,800 cubic feet per occupant, according to specified conditions, shall be supplied, unless the cubic space in the workroom is over 2,000 cubic feet per occupant and the outside window and door space is equal to one-eighth of the floor space.

In formulating [illegible]

[illegible] as to whether the basis of standardization should be a mechanical or an analytical one. Ventilating engineers prefer to have the amount of air supply fixed as in the Illinois law. Sanitarians argue that the proper standard should be the actual condition maintained in the workroom however it may be realized.

Proposed Laws and Standards

In a proposed law drafted in New York during 1911 an attempt was made to combine the two viewpoints on an alternative basis. This law provides that a workroom shall be deemed to be properly and sufficiently ventilated if the air in the working parts does not contain more than nine parts of carbon dioxide in 10,000 volumes of air in excess of the number of parts of carbon dioxide in 10,000 volumes of the exterior air, or if there is constantly supplied throughout the interior of the room at least 1,200 cubic feet of air per hour for each person there employed, and in addition at least 1,000 cubic feet of air per hour per cubic foot of gas burned per hour.

Such a law, which demands a reasonable rate of air change, to be demonstrated either by analysis or on a mechanical basis, seems, in the opinion of Professor Winslow, eminently fair to the manufacturer and probably safeguards sufficiently the health of the worker so far as the extent of the air change is concerned. Any ventilation standard must, however, deal with the quality as well as with the quantity of air. The most important things are the temperature and humidity of the air and these should both be determined at stated intervals and the results obtained should govern the operation of the ventilating system.

The difficulty in formulating a standard for factory ventilation is evident when the different conditions under which operatives work in the various industries is considered. Either the Illinois law or the proposed New York law would serve pretty well to regulate the amount of air to be supplied, but any rigid statutory standard would be likely to work hardship to the manufacturer on the one hand and to give inadequate protection to the worker on the other.

In Wisconsin, in view of the difficulty of formulating legal standards, the state has adopted an entirely different plan, abandoning the attempt to fix the details of factory regulation in the form of law, and creating instead an industrial committee with power to fix specific standards whose reasonableness can be reviewed only by the Supreme Court of the state. The regulations of such a committee could be made far more responsive to the varied and changing conditions of science and industry and, in the opinion of Professor Winslow, this scheme offers the most protection for the worker with a minimum burden on the business itself.

Practical Methods of Studying Air Conditions

An excellent opportunity is offered for the individual factory owner to benefit his employees by attention to the air conditions as regard temperature and humidity. There should be a thermometer in every working room and the foreman should be made to understand that every time the temperature passes 70 deg. he is failing to secure the best work from the men under his direction. In all large factories observations of ordinary temperatures should be supplemented by the use of the sling-psychrometer, the latter a device for obtaining humidity and temperature. Only by such observations can window ventilation in small shops and ventilating systems in large factories be controlled in an intelligent manner.

Professor Winslow calls attention to the fact that direct practical results in diminishing absences and decreasing damaged and imperfect work have been obtained in many factories by improving the air conditions. Efficiency methods have been applied through a hundred mechanical details of shop administration, while in many a workshop, perhaps in most workshops, the human body is being operated under conditions which preclude its maximum effectiveness, and the work suffers while the sanitariums fill up with cases of industrial tuberculosis.

Prevention of Missed Fires in Quarry Blasting

MEANS of preventing accidents due to missed fires in quarry blasting were discussed by Mr. W. H. Mason, of Stewartsville, N. J., in a paper presented Dec. 5 before the American Society of Mechanical Engineers at its annual meeting in New York City.

Missed holes are always a source of danger and, up to the present time, no safe way of unloading them, Mr. Mason stated, has been discovered. The ordinary method of handling them is to drill a second hole adjacent to the missed one and subsequently shoot them both, the missed hole being exploded by the detonation of the new one. This operation has two distinct disadvantages: first, there is liability of the drill reaching the dynamite in the loaded hole, thereby causing an explosion; secondly, the second shot may throw the explosive from the missed hole out among the debris without exploding it. This is said to occur frequently and unless extreme precautions are used in loading the debris, a chance blow on the dynamite may cause an explosion. It is therefore highly advisable to prevent missed fires entirely, if possible.

As a means of accomplishing this the Edison Portland Cement Company for the past eight years has been exploding all churn drill blast holes with a 500-volt direct-current power circuit. Many of these blasts have included from 12 to 20 holes, each loaded with 500 to 800 lb. of 40 and 50 per cent gelatine powder, and during this time there has been only one missed hole. On this occasion, it was impossible to find the cause of failure, but it was attributed to a poor connection between the exploder leads and the bus wires. Previously, this company had been using the common push-down batteries, and it was a usual thing to have several missed holes per month. At one of the company's quarries located where no power circuit is available a 250-volt direct-current generator, driven by a steam turbine, has been installed for setting off blasts and has given entire satisfaction.

In discussing the use of gelatine powder, Mr. Mason called attention to the fact that it is the most difficult of all the dynamites to detonate, and also that if exploded by a powerful detonator the full effect of the powder is obtained, while if improperly detonated much of the effect is lost. For this reason, and also on account of the danger and expense which always accompany a missed hole, it is well, in his opinion, to use an ample supply of high power exploders. In a 6-in. hole, running 60 ft. deep, not less than three exploders should be used. One of these should be directly at the bottom, so that if when loading the hole with dynamite a stone should slide in from the side and block it off, it would still be possible to explode the dynamite below. The other two are placed one near the center and the other near the top. All are connected directly across the 500-volt or 2500-volt direct-current line, so that all exploders are in parallel, and receive the full voltage of the power circuit. By this method any number of holes may be exploded at one time.

The cost of the extra exploders is always a small proportion of the cost of the dynamite used, and, in Mr. Mason's opinion, this expense is warranted by the increased detonating power of the exploder, as well as by insurance against missed fires, which are always expensive even aside from their potential danger. Their use has also resulted in greater general efficiency on the part of the workman.

An American contemporary gives an account of the electrical equipment of the International Bridge over the ship canal at Black Rock, New York. This is one of the longest and heaviest single-span bridges in the United States, being 431 ft. 5 in. long, 29 ft. wide, with a clearance of 22 ft. 6 in. above the water-line. It provides for the operation of trains over a double track, and for electric cars and pedestrian traffic. It is used by five trunk lines and is able to handle an average of 300 trains per day. This bridge is operated electrically and can be swung in 70 seconds. The two turning motors are of the traction type. Each is rated at 53 horse power and is guaranteed to develop 100 per cent. overload for a short time. In addition, there are two end-lift motors of 15 horse power each, and two smaller motors of 5 horse power each to operate the rail wedges. A small air-compressor supplies power for operating the end lock and band brakes. All the plant is controlled from the operator's house above the deck of the bridge. By use of contactors, which are controlled by sliding contacts connected to the end mechanism, to rail wedges and to the drum of the bridge, it is impossible for the operator to go wrong in opening the bridge.

A paper by Messrs. William Campbell and John Glassford, of Columbia University, New York, dealing with the constitution of cast iron and the effects of superheated steam is printed in the "Proceedings" of the International Association for Testing Materials. Failures of cast iron when used for fittings exposed to the action of superheated steam appear to have been common, and the matter has received a considerable amount of attention on the other side of the Atlantic. Despite the researches which have been carried out, there is still considerable diversity of opinion as to the causes of such failure, some being inclined to regard them as mechanical, others as chemical. The authors mentioned have subjected many specimens of iron to the action of superheated steam, and from the results observed conclude that white cast iron, steel, and malleable cast iron all show the same type of oxidation on treatment with superheated steam. A regular skin of oxide is formed, which also fills up any cracks that may be present, but grey cast irons containing up to 0.95 per cent. of silicon, whilst showing at similar surface oxidation, also exhibit a slight penetration of oxide following the coarsest of the graphite flakes. Increase in silicon appears to coincide with increase in corrosion, and the constitution of a specimen containing 5.5 per cent. of silicon was completely altered when treated with superheated steam.

Most people fail to be original because they fear to be.

Montreal Apartment House

A ten storey apartment house is to be constructed by Mr. James H. Maher, Montreal, on the Cote des Neiges Road, Montreal. The area is 44 x 108, and it is proposed to erect a reinforced concrete building on a steel frame, the exterior to be of Indiana limestone and pressed brick. It will be fireproof, the floors being of reinforced concrete, and ceilings of concrete and metal lath. The roof is to be of concrete. The apartments, which will be divided into suites of from four to seven rooms, are to be made of a high class character, and equipped with all the latest appliances for comfort and convenience. One or two bathrooms will be provided, according to the size of the suites. The heating will be by means of a pressure fed system, and there will also be electric lighting. A vacuum cleaner system will also be installed in the basement. Two passenger elevators will be provided. The Dominion Bridge Company will supply the steel for the building.

In the tabulation of responses from 7,500 companies out of 40,000 who were sent invitations to attend last winter's Motor Truck shows in the Eastern States, 482 were from the building and contracting field this classification leading the list. The annual national exhibition of commercial motor vehicles will be held Feb. 10-15, 1913, occupying the second week of the Thirteenth Annual National Automobile show in the Coliseum, Chicago.

An experimental strip of concrete paving laid on the [illegible] Road, Minneapolis, at [illegible] per square yard, is said to have proved so satisfactory that concrete will probably be used on a number of Minneapolis streets.

HAMILTON

Canada's Little Birmingham, A City of Progress whose Industrial Ramifications and Constructional Development During Recent Years have Occupied the Attention of a Whole Continent

HAMILTON, one of the most important manufacturing centres of Canada, is situated on the shores of Hamilton Bay, a beautiful land-locked harbor connected with Lake Ontario by the Burlington Canal. It extends from east to west for a distance of about six miles, and from north to south (from the Bay to the Mountain) for about three miles. From the summit of escarpment, or the Mountain as it is generally called, a magnificent view is to be had. The city lies immediately below, with its wide regularly laid and well-paved streets, its fine residences and public buildings, and its wealth of beautiful shade trees. To the north are the clear waters of Hamilton Bay; to the west is a bird's eye view of Dundas Valley; to the east, five miles away, is Burlington Beach, Hamilton's favorite summer resort, separating Hamilton Bay from Lake Ontario; while to the south-east "The Fruit Garden of Canada" greets the eye in a panoramic view seldom equalled and certainly not surpassed by any other on the American continent.

Hamilton has attained its position as one of the leading industrial centres of the Dominion through the creative enterprises and ability of its citizens, who have taken every advantage of the splendid geographical position of the city and have combined business acumen with civic co-operation.

Hamilton stands for industrial supremacy. It stands for more than this, however. Some of the most far-reaching movements that have influenced the national life of the Dominion have had their rise in this City of Ideas. The Canadian movement was begun in Hamilton twenty years ago, and Empire Day was initiated some years thereafter. These are but two examples of many that might be cited.

The first white settler to leave any record in the community was Robert Land, who arrived from the United States in 1778. Not being in sympathy with the efforts that were being made by the colonists on the other side of the border to overthrow the yoke of the motherland, he came to Canada and took up three hundred acres in the territory now bounded by the Bay on the north, Wellington street on the west, Main street on the south, and Wentworth street on the east. Thirteen years later the first survey of this district made by Augustus Jones, Deputy Provincial Land Surveyor, showed that there were thirty-one families in Hamilton.

In 1812-13 Hamilton became a point of military importance. General Vincent retired from the Niagara frontier to Burlington Heights, on the north-west boundaries of the city, and from that base achieved his brilliant victory at Stony Creek in June, 1813.

In 1813 George Hamilton divided his farm into lots and from him the settlement took its name.

The first impetus given to the city's industrial life may be dated at 1823, when the Burlington Canal was constructed. At that period Ancaster and Dundas were thriving communities and Hamilton's chief rivals.

It was not until 1846 that Hamilton had acquired sufficient population to entitle it to be incorporated as a city. From 1824 until 1846 its growth had been slow. The year 1832 was one of calamity, pestilence and fire nearly wiping out the progressive village. In 1833, however, Hamilton rose Phoenix-like, from its ashes. Rugged pioneers rebuilt the place and within a year it had prospered to such an extent that application was made for incorporation as a city.

It was in the early '50's that real growth commenced. The coming of the Great Western Railway established an era of industrial activity. Hamilton's population had increased from 3,446 in 1841 to 10,312 in 1850. In 1858 the population was estimated at 27,500. But then came a season of depression. The young city became too ambitious:—it undertook too much. It invested largely in railways; it built magnificent waterworks; it dug expensive sewers; it erected gas works. The burden of the debt which it brought upon itself was too much for its people to bear. Years of disaster followed. Property fell in values and business decayed. The population decreased. In 1861 the government census commissioners found but 19,096 souls there, and three years later the city assessors reported about 17,000.

Hamiltonians, however, even in those early days, had a reputation for tenacity and loyalty. They rallied from this state of depression, business revived and Hamilton once more entered the race with other Canadian cities. Happily since that time there have been no such reverses.

Some Population Figures

A glance at the following table will illustrate Hamilton's development as far as population is concerned.

1791	31	families
1834	2,100	persons
1841	3,446	
1847	6,832	"
1850	10,312	"
1858	27,500	
1861	19,096	
1864	17,000	
1871	26,716	"
1881	35,359	
1891	[illegible]	
1901	52,665	"
1911	80,000	
1912	over 90,000	

It will be seen from this table that it took nearly fourteen years to regain the mark established in 1858. It is interesting to note the solid and substantial increase shown in the last decade. The increase in population in the last five years alone has been over thirty-five per cent.

Increase in Assessment

A few figures illustrative of Hamilton's growth in assessment values are indispensable to a proper conception of Hamilton's development. In 1846, the year in which Hamilton became a city, the value of the total assessable property was $558,600. Other years are given below:

1855	[illegible]
1862	[illegible]
1873	12,680,000
1881	[illegible]
1891	[illegible]
1901	[illegible]
1911	[illegible]
1912	[illegible]

Transportation Facilities

At the head of Lake Ontario, with the finest natural harbor in Canada, Hamilton possesses excellent shipping facilities to the north-west provinces and Europe. Within the next few years the government will spend one million dollars on deepening the harbor. The tonnage in Hamilton Harbor last year was only surpassed by Montreal and was three times as great as that of its nearest competitor, so that it is not difficult to picture what part the harbor will play in Hamilton's future after the necessary improvements have been made.

Mention has been made of the advantageous location of Hamilton for rail and water transportation facilities. To realize how great are her geographical advantages it is necessary only to study the map. The city lies at the head of Lake Ontario and naturally forms the marine depot for a large section of the country.

The local trade with the near lake ports is large, and freighters carry great cargoes to and from the upper lake points and all parts along the St. Lawrence River. The vessel traffic is also a great feeder of the railways. The importance of Hamilton's growing marine interests may be estimated in part by the fact that at present no fewer than 25 of the large freight carriers of the Great Lakes are calling regularly at Hamilton docks.

Hamilton's steam railway facilities are of the best. The city is on the main line of the Grand Trunk, T. H. & B. and C. P. R. branch. Through the latter, direct connection at Waterford and Welland is made with the Michigan Central and the Wabash lines, and at Buffalo with all United States lines running from that point. The Canadian Northern will no doubt soon enter Hamilton by a selected route across the western end of the Bay.

The Toronto, Hamilton and Buffalo road, although not so prominent in the transportation world, has a broad field through its connections with United States railways and also because it passes through a large domestic territory. It is not, as its name would imply, a Hamilton-to-Toronto line. This section is served by the C.P.R. The T. H. & B. is an 80-mile line from Hamilton through Waterford and Welland. It is owned by the C.P.R. and the Michigan Central and per mileage is the best paying road in Canada.

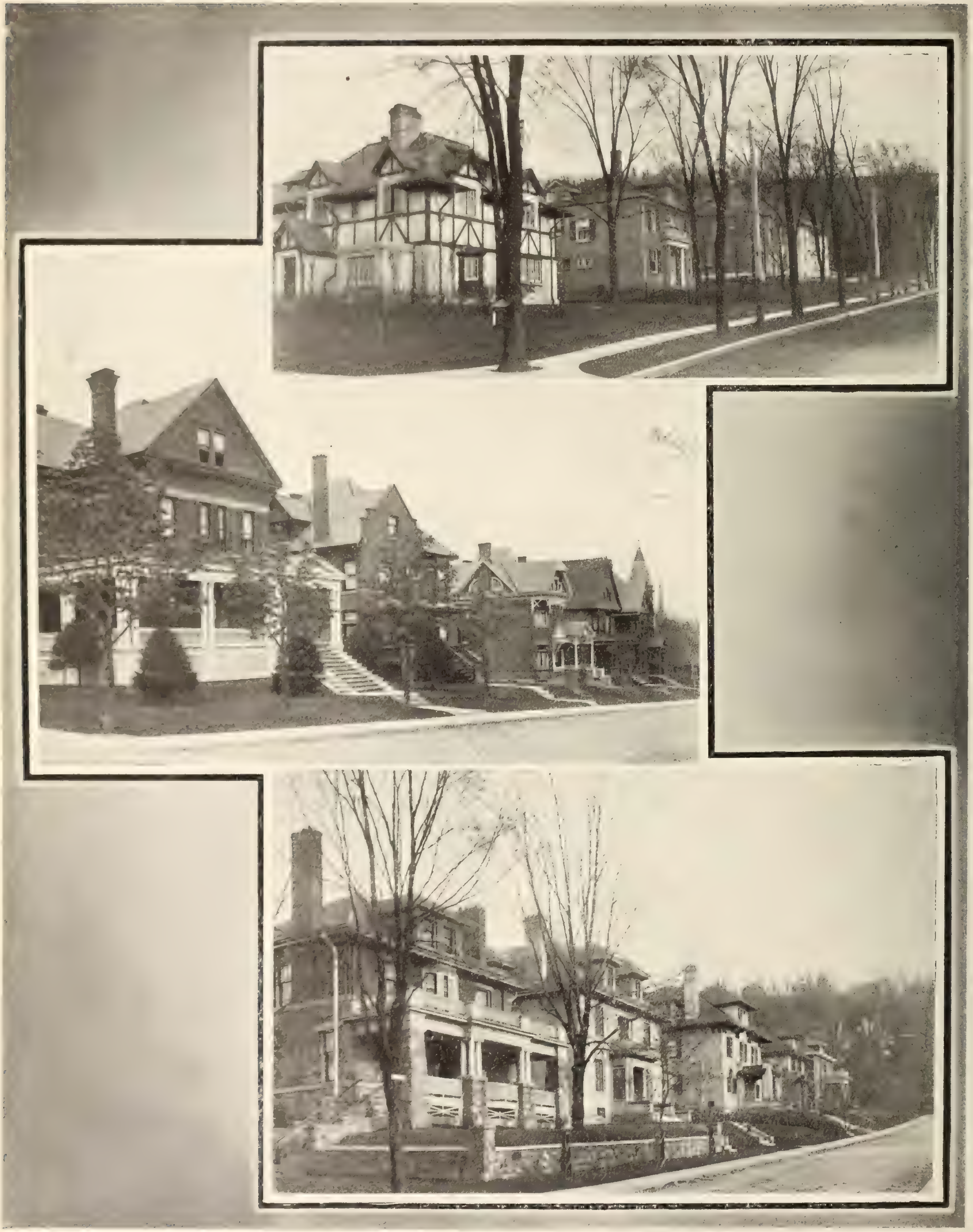
One of the important features of the T. H. & B. is the belt spur line cutting across the city from south to north in the extreme east and running westward through the factory district as far as Wellington street. This cross-town line puts manufacturers into direct touch with quick transportation facilities, and nearly every manufacturer along the line has his own private siding connection.

In the matter of electric railways, Hamilton has shown enterprise and energy. Its favorable situation and cheapness of electric power rendered it the natural pioneer in radial railway prpmotion.

Hamilton claims to have a greater area served by suburban lines than any other city or town in the Dominion.

Four Hundred Varied Industries

Hamilton has been called the "Birmingham of Canada" on account of its four hundred industries. Anticipating that the tidal wave of agricultural immigration, which for the last few years has been flowing into Western Canada, would be followed closely by an influx of American manufacturers, Hamilton took the precaution early to secure as much of the industrial investment as possible. To-day it is said that there is more United States capital invested in Hamilton in industrial enterprises than in any Canadian city. Over



Residential Street Scenes at Hamilton.

forty U. S. firms have invested in Hamilton, representing an expenditure of more than twenty million dollars.

During 1912 important extensions to their plants were made by many of the city's leading firms. The Oliver Chilled Plow Works have erected a large 4-storey warehouse on the water-front, conveniently situated for loading the lake-carrying freight, at a cost of over $100,000. The $500,000 plant of the Standard Underground Cable Company has just been completed and is being equipped very rapidly. About one-quarter of the plant is now in operation. The Petrie Manufacturing Company have built a $30,000 addition. The Grasselli Chemical Company have erected buildings to the extent of $50,000.

The east-end plant of the Hamilton Bridge Works has been completed at a cost of over $100,000. The main building is 80 by 100 and will soon be extended to 400 ft.

The Dominion Steel Castings Company are putting up a $300,000 plant which, it is claimed, will be the most up-to-date steel casting plant on the continent. They expect to be pouring steel early in the new year and will employ four hundred men.

The National Steel Car Company are putting up a million-dollar plant and will be employing one thousand men by January, 1913, turning out thirty to thirty-five steel and wood freight cars per day. The speed in erecting these buildings has made a record in this type of factory construction in Canada.

The Steel Company of Canada have spent nearly two million dollars this year in extensions. They have erected a new rod mill, nearly two blocks in length and 85 ft. wide. They are also erecting a mill, 475 by 60 ft., also an addition to their open-hearth furnace, 100 by 85 ft., and a gas producer building, 40 by 50 ft.

These factories are of the very latest type of factory construction and are up-to-date in every respect. Messrs. Prack & Perrine, industrial architects and engineers, who have been identified with the engineering and construction of some of the largest manufacturing plants in the United States, have prepared plans and had charge of the construction of buildings and installation of machinery in practically all of these factories.

The following figures prove that Hamilton's prosperity is natural and not a boom. The average yearly increase in population during the last five years has been over 5,000 and over 8,000 for the last two years. The average increase in building permits for the past five years has been over one million dollars a year, while the increase for the past two years has been nearly two million dollars a year.

Hamilton As An Electrical Centre

The city of Hamilton is one of Canada's most important electrical centres. During the past year some very important developments have taken place.

The passing on July 25, 1911, of the by-law to raise $505,000 placed Hamilton among the union of municipalities to use hydro-electric power developed at Niagara Falls, and distributed by the Hydro-electric Power Commission of Ontario. In consequence, the rate situation is materially improved, although cheap power for large consumers was already a prominent feature of Hamilton's industrial progress. Hydro-electric power will act as an equalizer to prevent discrimination and provide a more efficient service.

The plans of the Hamilton Hydro-electric Department cover the installation of one main station, which is now in operation, having about 1000 h.p. available capacity and a designed capacity of 4000 h.p.

The proposed street lighting system, which is required to be ready for service by July 1, 1914, is designed for about 1000 kw. capacity, using 400 ornamental five-light standards and 6,500 concrete poles carrying ornamental bracket light and secondary wire.

An underground system has been designed and provided for in the estimates which will clear about seven miles of streets of all poles excepting those used for trolley suspensions. In this particular Hamilton will lead all other Canadian municipalities.

The establishment in Hamilton of the Standard Underground Cable Company of Canada, Limited, and the Boston Insulated Wire & Cable Company of Canada places Hamilton with her already large electrical industries, in a prominent place as an electrical manufacturing centre.

Municipal and Other Construction

Early in 1912 the city council passed an amount of work which well exceeds the $700,000 mark. Various public buildings, water mains and sewers are under construction.

Probably the biggest job undertaken so far is the laying of the new 36-inch water main from the pumping station to Ottawa street and westerly. The work when completed will cost $60,000, and it will mean a greatly improved water service for the entire city. The engineer's department also expects to undertake the laying of a new water main through the entire city connecting with the new 36-inch main and running to Cannon street in the east end, thence being divided. This project will cost $300,000.

New Pumping Station

Rapid progress is being made with the new pumping station at the Beach. The foundations are already in and the remainder of the work is being rushed. New pumps and motors will be installed there, and the total cost of the work, including building and machinery, will be $70,000. As it is the intention to operate the pumping machinery by electric power, the existing steam plant of 13,000,000 gallons' nominal capacity will be maintained in perfect working order. To insure which each engine will be operated periodically one half day a month at least. A third electrically-operated unit of 6,000,000 gallons has been installed and a fourth will be added as a reserve, that is, the capacity of the present plant will be duplicated.

Another interesting piece of work under the City Engineer's department is the new intake into the Lake. This will be run approximately half a mile into the Lake, clear of the muddy water zone following stormy weather, and will ensure cold, clear water. The cost is placed at $31,000.

During the winter months, drift-ice is frequently piled up by gales to a height of fifteen feet or more above the level of the lake, the loose ice being cemented together by the freezing of spray and waves. The ice accumulations may extend to a depth of twenty feet of water, and slush ice may occasionally be found at greater depths.

The inlet of the existing 20-in. intake is subject to interference from ice and may be blocked any winter. This intake must also convey to the basin large quantities of sand in suspension, which can only be removed by dredging.

The new intake will be laid from the southerly end of the basin. This pipe will be 40 in. in diameter

Hamilton is Not Exclusively a Manufacturing Centre. Every Advantage is Taken of the Delightful Environs.

Photographic Evidences of Hamilton's Natural Charm which Lends the City to Civic Improvement and Artistic Development.

An early constructional view of the International Harvester Company's plant at Hamilton

and 2,000 ft. in length. The water end will terminate in a timber crib, 24 ft. square and 12 ft. in height, provided with inlet screens. The openings in the crib for the entrance of the water will be of sufficient area to prevent a too rapid current in the vicinity. The pipe will be of rivetted steel, laid in a dredged channel well beneath the bed of the lake. It will be necessary to provide flexible joints and expansion joints at proper intervals and within the basin, a concrete gate house will be built, with gate provided to close intake.

West end sewer under construction at Hamilton

Many complaints were made last year about the conduit which carries the water from the filtering basins to the wells at the pump house. The result is that a new conduit is being built at a cost of over $30,000.

A large amount of money is also being spent towards increasing the efficiency of the high level pumping station. A new building, to be equipped with four new pumps, is being erected immediately adjoining the present station on Ferguson avenue S. Two of the new pumps will pump direct to the mountain top where a standpipe will be erected. The other two will distribute the water into the high level district, ensuring a constant and sufficient supply. The total cost of the work there will be $70,000, including building and machinery.

The west-end sewer has been completed at a cost of $60,000. The inside diameter is 6 feet 6 inches. It runs from Garth street, near the T. H. & B. roundhouse, to a point 500 ft. north of King street, near the intersection of that street and Main street. This year the city will undertake the construction of the sewage disposal plant at that point. The estimated cost is $60,000.

Outside of the City Engineer's department considerable activity is being shown in other branches of civic work. Notable amongst these is the Gore convenience upon which work is progressing rapidly. When completed the station will cost between $35,000 and $40,000.

Tenders have been opened for the Sick Children's Hospital and new Central fire station. The former will cost about $35,000 and the latter close to $50,000. Work on both of these projects will be commenced as soon as possible. The Hydro-electric department is erecting a costly station adjoining the new station.

Special Engineering Work of 1912

Following is a statement of the special engineering work of 1912—prepared for this journal by Mr. A. F. Macallum, City Engineer of Hamilton:

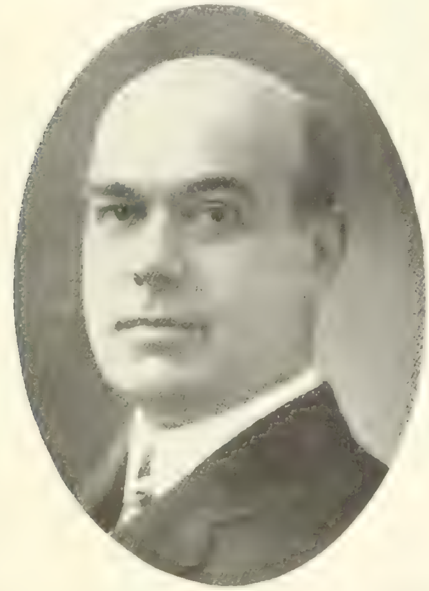
Intake Pipe.—Construction work was started upon a 4 ft. steel intake pipe to extend into the Lake off the Basin, a distance of 2,500 feet. The contract for this work was let to John Danforth & Company, of Buffalo, and the pipe was manufactured by the Car-

Laying 36-in. main at Hamilton

roll-Porter Company, of Pittsburg. The total amount of this contract was $31,500.

From the settling basin to the pumping station a new 4 ft. reinforced concrete pipe was laid to carry the water to the new pumping wells and pump-house now being built. The John Danforth Company also had this contract for $30,000, the total distance being 1,900 feet.

This conduit crosses the inlet at the mouth of Lottridge Creek, requiring very heavy piling and diversion work during floods.



Mr. A. F. Macallum, City Engineer of Hamilton

Plans were completed for the new pumping station, the foundation of which is now practically finished. The station will be about 100 ft. long by 50 ft. deep, and will be built partly over the existing turbine pumping station. The cost of this will be about $25,000.

Two more Hydro-electric units, with turbines of 6,500,000 gallons capacity each will be added. The contracts for these are now being carried out by The Canada Foundry Company of Toronto. This, when completed, will give four electric units with a capacity of 25 million gallons in 24 hours, besides a steam capacity of 13,000,000 gallons.

From the pumping station to the city, a new 36 in. main has been constructed during the past season. On this main, on account of the scarcity of labor, it was decided to use as much plant as possible, and a steam shovel for excavating, a donkey engine with cars for hauling material, and an air compressor plant with pneumatic hammers, were used. With an average depth of 7½ ft. to the bottom of the trench, through a heavy clay soil, twelve pipe a. day were laid, on an average, under favorable conditions. This 36 in. main was completed recently. In passing, it may be pointed out that in the tests made reference to the relative efficiency of hand caulking and pneumatic hammer caulking, the pneumatic hammer gave the better joint.

Tenders have been let for new pumps for the High Level district and also for two high lift pumps for the Mountain district. These four pumps have a capacity of one million gallons every 24 hours. A new pumping station for this installation is at present about half completed. The total cost of the plant and building is $70,000. Pressure mains in connection with the new rising main from the Beach are being laid throughout the city. The total cost of these mains is about $200,000.

Plans have been drawn and tenders will be taken in the spring for the new west-end disposal works, which will take the flow from the 6½ ft. concrete sewer just completed. The cost is estimated at $60,000. In the east end of the city the present disposal works having become inadequate, additions and alterations amounting to $50,000, are now being laid out.

Asphalt Pavements.—All the paving in the city has been done by day labor. An unique feature of the asphalt pavement just laid on Barton street east was the reinforcing with twisted steel rods under the railway tracks, which were directly over the cutting made recently for a trunk sewer. The continual settlement of this sewer, having been filled in with rock, shale and clay, made this bridging necessary to avoid possible sinking.

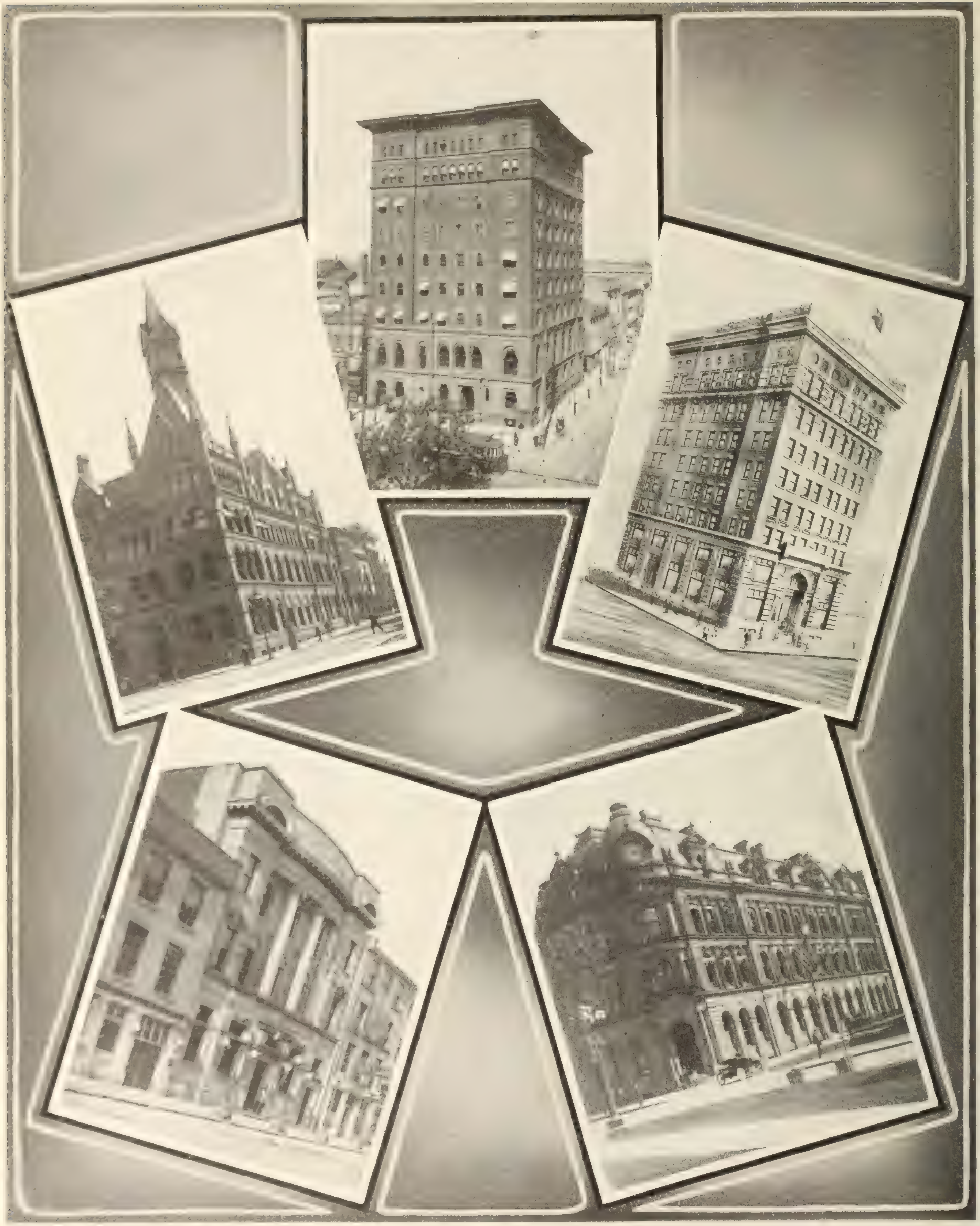
Of the different sewers constructed during 1912, the only one of any difficulty was on Ottawa street, which was cut through rock. The upper 5 ft. of the cutting was shale and clay and the lower 10 ft. rather solid shale and rock, which had to be taken out by blasting. This was a 30 in. sewer composed of monolithic concrete until the winter season commenced. Then, to facilitate the quick laying of the pipe, it was necessary to change to reinforced concrete pipe of the same diameter. The sewer, at present, is a little more than half finished. The estimated cost is $26,000.

Plans have been drawn for a high level bridge across the valley at the head of Coote's Paradise on Main street. This bridge will be about 50 ft. above the level of this valley and will be built of reinforced concrete. Work will probably be commenced during the winter season.

Mr. H. M. Marsh, Hamilton's Industrial Commissioner

A subway is now being built under the main line of the G. T. Railway at Birch avenue to carry that street underneath. The estimated cost of this work is $60,000.

The Building Inspector's Annual Report shows a remarkable growth in Hamilton this last year. Fifty firms have taken out permits for new factories or factory extensions to the value of $1,234,230. Twelve new factories with an invested capital of over two million dollars have located here during the past year.



A GROUP OF NOTEWORTHY COMMERCIAL BUILDINGS AT HAMILTON

Bank of Hamilton

Canada Life Assurance Co.
Traders Bank

Federal Life Assurance Co.
Hamilton Provident & Loan Co.

An Important Hamilton Industry

THE plant of the Dominion Steel Castings Company, Limited, is situated on a site of ten acres at the east end of the city, about two and a half miles from the City Hall, on Depew street between the Beach road and Gilkinson street. The plant at present consists of six buildings, steel foundry, finishing department, power house, stock room, pattern shop and pattern storage. The buildings have steel frames with reinforced concrete, steel sash and glass.

The foundry is one hundred and sixty feet wide by three hundred feet long, served with one twenty-five ton and two ten ton cranes. A four-motor thirty-ton crane is on order and will shortly be installed.

There are two oil-fired open hearth furnaces each having a capacity of twenty tons. The melting platform is of structural steel, and is the full width of the 50 ft. bay. Provisions have been made for an overhead charging machine which will be added later.

There are four drying ovens, 15 x 40 ft., inside dimensions. These are coke-fired from the side, and the flues are placed to give a uniform distribution of heat. The core ovens are located in the centre of the core room and are served with trucks from either side in such a manner as to make the oven operation continuous.

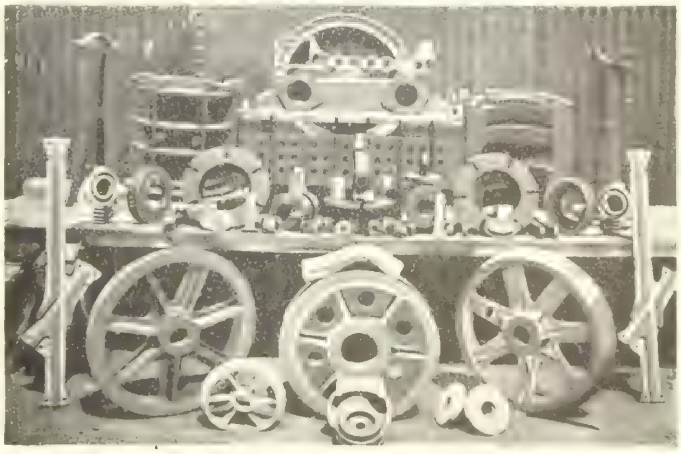
The foundry and core room are equipped with jar ramming machines and other types of molding machines which are served with a jib crane, which reaches into the two bays that are served by the overhead crane. The sand mills are located in a corner of the foundry near the sand bins, and are of the old fashioned type, as generally used in steel foundries.

The finishing department, which is 60 by 200 ft. in dimensions, is served by a 10-ton crane. The equipment includes cold saws, shapers, emery wheels, etc., and there is an oxy-acetylene cutter for removing sprue and risers. All castings are annealed, for which purpose there are three annealing furnaces fired by coal. One of these measures 4 by 6 ft., and is used for small castings. The other two are open top, type furnaces, 7 ft. by 7 ft., and 40 ft. long by 5 ft. wide. This latter furnace is fired from four fire-places arranged along the side and in such a manner as to give an even distribution of the heat. There is now being built a straightening press with a bed twenty feet long by five feet wide equipped with a motor-driven hydraulic ram which will be used in straightening castings.

The company has installed a sand blast equipment, consisting of a room twelve feet square, a sand blast rolling barrel and a dust rester. This equipment is intended to be used in connection with the smaller type castings which will be produced from the stock converter.

The stock yard for the storage of steel scrap, pig iron, etc., is served by a 10-ton crane with a magnet, for unloading. This crane will also handle the material for charging and will deliver it directly to the open-hearth platform.

The power house has a 700-ft. air compressor driven by a 100 h.p. motor. Further equipment in the power house includes a Roots blower, operating by a 100 h.p. motor which provides blasts at six pounds pressure for stock converter. There is a motor generator set of 150 h.p., which provides direct current for crane motor, and also for lifting magnets. Power is purchased from outside sources and is being received at 2,200 volts. The motor generator set and the air compressor are operated by high voltage motors. Other motors throughout the shops use 220 volt by two transformers in the power house each of 100 kw. capacity.

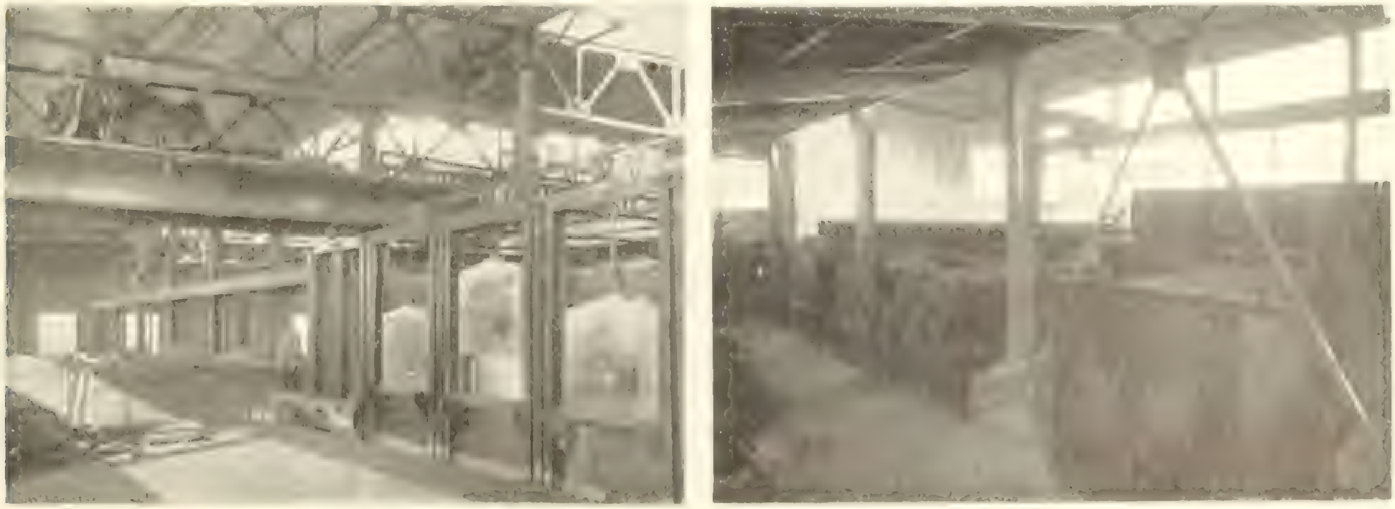


Specimens of steel castings produced by the "Stock" oil-fired converter

Oil is stored underground in three large tanks with a capacity of 12,000 gallons each. This is pumped by a small triplex pump into a tank in the power house and the constant pressure regulated by compressed air.

The laboratory is just being completed and will be fully equipped for all chemical and physical tests of steel castings.

The pattern shop is 60 x 80 feet, considerably larger than is actually required, but this department has been fully equipped with both wooden and metal pattern making machines, and the company intend to furnish patterns at reasonable rates. This will enable them to do the complete work



Interior views of the Dominion Steel Castings Company's plant making patterns and furnishing castings to blue prints.

The stock converter work, will be a feature of their business. This process has been in use in England for over three years and the one plant already installed in the United States is in successful operation making light castings such as superheater, steam heads for locomotives, and automobile parts for some of the largest and most representative concerns in the country.

As a further evidence of the quality of steel produced by this method these converters are in successful operation in the plants of such representative companies as the following:—Darlington Forge Company, Darlington; Caper Robson Company, Darlington; Armstrong Whitworth Company, Manchester; Daimer Motor Company, Coventry, and the Wolseley Company, Birmingham.

Castings produced by this process are the only converter castings which are acceptable to the Admiralty in England and used in naval construction. A study of the illustrations will show very intricate castings as well as heavier shapes being made by this process. It is particularly adapted to special alloy steel as manganese, nickle, chrome, or Vanadium steel.

The foundry has a capacity of 1,200 tons a month with ample facilities for doubling this output.

Mr. C. W. Sherman is President and General Manager, Mr. Allen Mosher Vice-President, and Mr. Austin C. Taylor, Secretary and Treasurer, of the Dominion Steel Castings Company, Limited.

The Standard Underground Cable Company's Plant at Hamilton

This plant was built to meet the company's ever-increasing Canadian trade. At present this firm has works in Perth Amboy, N.J., St. Louis, Mo., and Oakland, Cal., the fourth plant being located at Hamilton. The plant was built for the manufacture of various copper-insulated and armor-covered wires required to meet the Canadian trade. There are five buildings for the various stages of manufacture, in addition to a large office and also a carpenter shop, besides a power house for generating part of the power required.

The main building is a three-storey building, one-half of which has a basement, 325 feet long and 65 feet wide, built of heavy mill construction. The lower floor is so designed as to take the concentration of the large 120,000 lb. reels. The main building is utilized for rubber mills and brading machines required in the process of insulation.

The wire mill is a one-storey building, 225 ft. long by 65 ft. wide, containing wire mills for drawing wire, etc. This building is directly attached to the main three-storey building. Branching to one side of this building there is the tinning room, 60 x 40 ft., of one-storey construction, for doing all necessary tinning required for various wires in the process of manufacture.

On the northwest corner of the main factory building there is provided a three-storey office direct connected to the main building, containing all offices relating to the company.

Standard Underground Cable Company's plant, Hamilton

Around the whole of the three-storey building and one-storey building, there is a reinforced concrete platform at the car platform level for loading or unloading reels direct. The main building has access on one side to the Grand Trunk and on the other to the T. H. & B. Railway. To one side of the main building there is an impregnating and lead room, a one-storey building, 225 ft. long by 60 ft. wide, one side of which has a reinforced concrete platform running the whole length along the T. H. & B. tracks.

These buildings are all of steel, brick and wood construction and are inter-communicating and direct connected with one another to avoid any re-crossing in the process of manufacture of material. They are further designed so as to obtain the maximum degree of light, there being large windows practically the whole width of the bays and carried clear to ceiling. The roofs of the various one-storey buildings are of the latest saw tooth type of construction with glass and ventilation. The three-storey building is provided with a continuous double "V" skylight the whole length of the roof.

The buildings are all thoroughly provided for fire protection and the large three-storey building has three separate and distinct stair towers, one of which connects to the roof. All stair openings are provided with fire doors and have direct outlets to streets.

The boiler and power house are of steel, concrete and brick construction, having provision for three large boilers and large coal storage which can be directly loaded from cars. The power house is so placed as to be centrally situated and have the least amount of pipes to all buildings. There being a large amount of steam required, the owners generate sufficient quantity to take care of all parts requiring heat, and there is sufficient left over to drive very small pumps and engines required in the process of manufacture. The main source of power, however, is drawn from the outside through electrical sources.

The plant was designed by Messrs. Prack & Perrine, industrial engineers, Hamilton.

The officers of the Standard Underground Cable Com-

Steelwork of the Standard Underground Cable Company's plant at an early stage of construction

Mr. B. H. Prack, Hamilton

pany, of Canada, Limited, are: President, Mr. J. W. Marsh; vice-president and manufacturer, Mr. W. A. Conner; vice-president and general sales manager, Mr. P. H. W. Smith; secretary and sales manager, Mr. W. H. Marsh; treasurer, Mr. F. A. Rinhart, and assistant to sales manager, Mr. H. G. Burd.

Industrial Engineering at Hamilton

Hamilton's industrial progress, to which considerable attention is devoted in this issue, is due in no small measure to the facilities available right on the ground—from the design and construction of the plant to the finished building.

In this fundamental consideration, Hamilton is fortunate in having attracted Messrs. Prack & Perrine to locate in the city. This firm's specialty is the design and construction of all kinds of industrial plants. They have had entire charge of many of the most important building schemes of this kind in Hamilton and other Canadian cities. The list of their undertakings is an exhaustive one and it is sufficient to mention the plants of the Standard Underground Cable Company and The Dominion Steel Castings Company, described in this issue.

Mr. R. B. Perrine, Hamilton

Mr. B. H. Prack, previous to entering business was Engineer of Works for the large Westinghouse Electric & Manufacturing Company's plant at East Pittsburgh. While there he had charge of all their buildings and acquired a practical knowledge of general factory practice. Mr. Prack was formerly in architectural practice at Pittsburgh.

Mr. Perrine, previous to entering into his present partnership with Mr. Prack, was Chief Engineer of The Van Dorn Iron Works at Cleveland. He has had an extended experience in all phases of reinforced concrete and structural steel design.

Sewage and Sanitation *

Committee Report by A. F. Macallum, City Engineer, Hamilton, Ont.

There appears to be a consensus of opinion among those representing state health authorities that the time has come when some definite action to prevent pollution of surface waters must be taken by the Federal government. Representatives from the United States and Canada have already had three meetings to work out a line of action in order to obtain the necessary data on which to pass an international policy taking all the states and provinces and centralizing under one association. The following bill was introduced in the Canadian Senate last year and, after being discussed, was referred to the Committee on Public Health, and there is little doubt that this or a similar bill will become the law in the near future. The bill briefly provides as follows:

"Every person is guilty of an offence against this act and liable on summary conviction to the penalties hereinafter provided, who puts, or causes or permits to be put, or to fall, flow, or to be carried into any navigable water, or into any other water any part of which is navigable or flows into any navigable waters, any solid or liquid sewage matter; or any other solid or liquid matter which, not being sewage, is poisonous, noxious, putrid, decomposing, refuse or waste, unless such matter, whether solid or liquid, is disposed of in accordance with regulations or orders made or permits granted under the authority of this act."

While such a bill is drastic there is no doubt but that it is necessary. Throughout the United States and Canada practically all the waterways in the populated districts are so hopelessly contaminated that they are unfit as sources of water supply unless artificially treated, and these are the principal sources of supply through this country. The Lake Michigan Water Commission adopted a resolution in which it stated that on that lake sources of supply even 20 to [illegible] miles from the point of entrance of large quantities of sewage are not safe places from which to derive water for domestic uses. The Water Commission appointed at Toronto to investigate that city's supply from Lake Ontario found that polluted water could be obtained sometimes as far out as 14 miles.

On account of the cheap means of sterilizing water supplies with very small quantities of hypochloride of lime it is very seldom that sewage is treated beyond the filter stage. The theory of the sanitarians of the present day is to remove from sewage only the [illegible] tributes which create nuisances by [illegible]

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* Presented at the recent Annual Convention of the American Society of Municipal Improvements.

Reinforced Concrete Construction—3

By Professor E. Brown
Department of Civil Engineering, McGill University, Montreal

The third of a special series[*], written exclusively for the Contract Record and Engineering Review

In the preceding articles the method of designing beams to resist bending has been considered, the necessity for reinforcement against the effects of shearing has been pointed out, and the means adopted in practice to provide the reinforcement have been explained. In the case of provision against shearing forces, the rules adopted in standard specifications are rather more empirical, and rest on a less satisfactory basis, than those used in connection with bending reinforcement. The principle of the method adopted is as follows:—

In Fig. 15 consider two sections of a rectangular beam at which the bending moments are M_1 and M_2 lb. inches and let them be unit distance (say 1 in.) apart. Then if

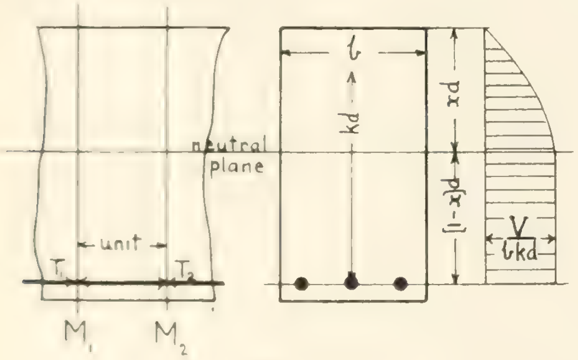

Fig. 15

b and d are the breadth and depth of the beam respectively in inches, and kd inches the distance from the centre of compression to the centre line of the steel, the tensions T_1 and T_2 lbs. at the respective sections are given by

$$T_1 = \frac{M_1}{kd} \text{ and } T_2 = \frac{M_2}{kd}$$

Thus if M_2 is the greater moment, there must be an increase of tension from T_1 to T_2 lbs. in a unit length of the tension reinforcement bars. This assumes that all the bending moment is carried by the steel, which may not be the case, as mentioned in the preceding article. The increase of tension $(T_2 - T_1)$ lb. can only take place by reason of the bond resistance between the concrete and the bars, and hence it must be transmitted into the body of the concrete above the bars, each layer between the bars and the neutral surface being equally stressed. The area of concrete over which this increase of tension is distributed is the horizontal area of the element of the beam between the sections considered i.e. b inches x 1 inch = b sq. in.

$$\text{Therefore, intensity of shearing stress} = \frac{T_2 - T_1}{b}$$

$$= \frac{M_2 - M_1}{bkd} \text{ lb./sq. in.}$$

Let V lb. = mean shearing force over length considered. Then $(M_2 - M_1) = V$ lb. x 1 inch = V lb. inch.

$$\text{Therefore, intensity of shearing stress} = \frac{V}{bkd} \text{ lb./sq. in.}$$

Now $kd = (1 - \frac{x}{3})d$, since the resultant compression stress must act through a point distant $\frac{xd}{3}$ from the outermost compression layer. For average conditions k will be roughly about ⅞, this being the value corresponding with x = 0.375. Hence, since this calculation is one to which a very considerable degree of approximation must necessarily be attached, it may be taken that the intensity of shearing stress at a section of a rectangular beam of breadth b inches, depth d inches, carrying a total shear V lb. is given by

$$q = \frac{V}{\frac{7}{8} bd} \text{ lb./sq. in.} \quad \text{———} \quad (1).$$

Above the neutral line, the shear stress would diminish to zero from the above value, the law of diminution being parabolic under the assumed conditions. The curve is shown in Fig. 15. The above analysis is that which is presented in standard specifications of the American Society of Civil Engineers, and other representative bodies associated with them in the work of drafting specifications. It is admittedly open to criticism, and serves only as a basis for more or less empirical specifications. The concrete itself is always assumed to be capable of resisting a certain amount of the shearing force without the presence of any shearing reinforcement, either in the form of stirrups or diagonal bars. So that, if V_1 is that part of the total shearing force at any section which is assumed to be carried by the reinforcement the following result is obtained:—

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[*] The first article was published in our issue of Nov. 20 last and the second on Dec. 4.

Stress in Stirrups

Let s inches denote the horizontal spacing of stirrups Then each stirrup is assumed to carry the vertical force which is due to an increase of moment V_1s, this vertical force being equal to the increment of the horizontal force in the tension reinforcement. Hence the force in each

stirrup $= \frac{V_1 s}{kd}$ where k is about ⅞ as before.

The stirrups may be designed to resist this force, and must be sufficiently bonded with the concrete to enable them to develop it. The hooked end by which the stirrups are held in position furnishes an ample anchorage. (See Fig. 13 of previous article).

Tee Beams

For Tee beams the value of kd in the above analysis may be taken to be the distance from the centre line of the tension reinforcement to the centre of the slab, and b is the width of the vertical stem of the beam.

Bond Stress Between Rods and Concrete

As explained above there must be an adhesion between the concrete and the tension bars, capable of allowing an increase in tension from T_1 to T_2, over a unit of length bounded by sections at which the bending moments are M_1 and M_2.

Therefore, $T_2 - T_1 = \frac{M_2 - M_1}{kd}$ lbs. = total bond stress on rods

Hence if o is the perimeter of each rod entering into the calculation and if there are n rods, there is a surface area (n x o x 1 in.) sq. in. between the sections, and the intensity of

the bond stress $= \frac{M_2 - M_1}{kdno} = \frac{V}{kdno}$ lb./sq. in. where V lb. = average shear over the unit of length considered.

When a bar is figured to carry a certain pull, care must be taken to ensure that it has a sufficient grip on the concrete to enable it to develop that pull. This condition requires that where a joint is made, a sufficient lap must be allowed, and that a rod must either be long enough at its anchorage to provide sufficient surface to develop its strength by the safe bond stress which can be allowed, or must have its end bent so as to secure an adequate anchorage. The value of a bent end in respect to its holding properties can only be found experimentally, and the handbooks on reinforced concrete work give ample particulars of the results of such tests. The matter is not susceptible of computation.

American Standard Specifications for Shear and Diagonal Tension

These express the position regarding shearing reinforcement very clearly, and may be quoted direct. Any form of stirrup or diagonal bar is alluded to as web reinforcement. The specifications, Section 8, read as follows:—

> "Calculations for web resistance shall be made on the basis of maximum shearing stresses as determined by the formulas hereinafter given. (These have been outlined above.) When the maximum shearing stresses exceed the value allowed for the concrete alone, web reinforcement must be provided to aid in carrying the diagonal tension stresses. This web reinforcement may consist of bent bars, or inclined or vertical members attached to or looped about the horizontal reinforcement. Where inclined members are used the connection to the horizontal reinforcement must be such as to insure against slip.
>
> "Experiments bearing on the design of details of web reinforcement are not yet complete enough to allow more than general and tentative recommendations to be made. It is well established, however, that a very moderate amount of reinforcement, such as is furnished by a few bars bent up at a small inclination, increases the strength of a beam against failure by diagonal tension to a considerable degree; and that a sufficient amount of web reinforcement can readily be provided to increase the shearing resistance to a value from three to four times that found when the bars are all horizontal and no web reinforcement is used. The following allowable values for the maximum shearing stress are therefore recommended, based on working stresses of Chap. VIII p. 33 of the specifications. (Note: The concrete assumed has a compressive strength of 2000 lb./sq. in. at 28 days).
>
> (a) For beams with horizontal bars only, 40 lb./sq. in.
>
> (b) For beams in which a part of the horizontal reinforcement is used in the form of bent-up bars, arranged with due respect to the shearing stresses, a higher value may be allowed, but not exceed 60 lb./sq. in.
>
> (c) For beams thoroughly reinforced for shear, a value not exceeding 120 lb./sq. in.
>
> In the calculation of web reinforcement to provide the strength required under (c) above, the concrete may be counted upon as carrying one-third of the shear. The remainder is to be provided for by means of metal reinforcement consisting of bent-up bars or stirrups, but preferably of both. The requisite amount of such reinforcement may be estimated on the assumption that the entire shear on a section, less the amount assumed to be carried by the concrete, is carried by the reinforcement in a length of beam equal to its depth.
>
> The longitudinal spacing of stirrups or bent rods shall not exceed three-fourths the depth of the beam. It is important that adequate bond strength be provided to develop the assumed strength of all shear reinforcement.
>
> Inasmuch as small deformations in the horizontal reinforcement tends to prevent the formation of diagonal cracks, a beam will be strengthened against diagonal tension failure by so arranging the horizontal reinforcement that the unit stresses at sections of large shear shall be relatively low."

The above Section from the standard specifications expresses the various points involved in a very definite manner, and admits the tentativeness of all such calculations as it submits for use in design. The belief expressed regarding the efficacy of a few bars bent up at a small angle is amply borne out by tests. The author has very frequently compared the behavior of two beams of the same dimensions, each containing three equal rods, the centre one of which was bent up in one beam at an angle of 45°, and in the other beam at a smaller angle. (See Fig. 16), the former case being shown by full lines and the latter by dotted lines. The latter beams almost invariably show better results than the former, there being a length of beam shown over which there is no diagonal metal, when the [illegible]. The additional length of [illegible] in the latter case is too small to be of any consequence

[illegible]

[illegible] practice and amounts to saying [illegible] reinforcement [illegible] at the [illegible] it is framed into a column or other [illegible]. In view of the uncertainty regarding the precise value of the bending moment at sections such as the above where continuity exists, the above clause is very timely.

Working Formulae from American Standard Specifications

The formula $q = \frac{V}{\frac{7}{8}bd}$ lb./sq. in. as deduced at the commencement of this article is used in conjunction with the limiting values set in (a) (b) and (c) above.

(a) Thus, if a beam is reinforced with horizontal bars only, $\frac{V}{\frac{7}{8}bd}$ must not exceed 40 lb./sq. in. i.e. $\frac{V}{bd}$ must not exceed 35 lb./sq. in. Hence, taking as an example a uniformly loaded beam, in which the shear is zero at the centre and increases uniformly towards the ends, the whole of the reinforcement against bending, may run along the tension face until the total shear V reaches a value of 35 times the cross sectional area of the beam. For Tee beams d is taken from the centre line of the steel to the centre of the slab and b is the width of the stem.

(b) When the limit imposed under (a) has been reached diagonal bars become necessary, and it is considered that the provision of these will enable the beams to resist a total shear V given by $\frac{V}{\frac{7}{8}bd} = 60$ lb./sq. in. i.e. $V = 52.5\ bd$ lbs. This would obviously be at a section nearer the ends than that given under (a). The diagonal bars are provided by bending up the tension reinforcement no longer required, or by the sheared wings as in a Kahn bar.

(c) When the limit of shear V, which can be resisted safely by a combination of horizontal and diagonal bars under (b), has been reached, vertical stirrups used in combination with these must be resorted to, and the greatest allowable shear stress is fixed at 120 lb./sq. in. That is $\frac{V}{\frac{7}{8}bd} = 120$ or $V = 105\ bd$. In other words, the beam section must be such that $\frac{V}{bd}$ does not exceed 105. If headroom were limited it might happen that the width b of the stem of a main Tee beam would be settled by this limitation, d being restricted abnormally and necessitating a wider beam than usual. In average circumstances, a beam which is wide enough to allow of a satisfactory spacing of the tension reinforcement at the centre, will be amply wide enough to carry the greatest shear V without exceeding the above limit, but it is desirable to check this point.

A design of a typical floor unit may now be commenced, any other points which require further elucidation being taken up as they arise in the progress of the design.

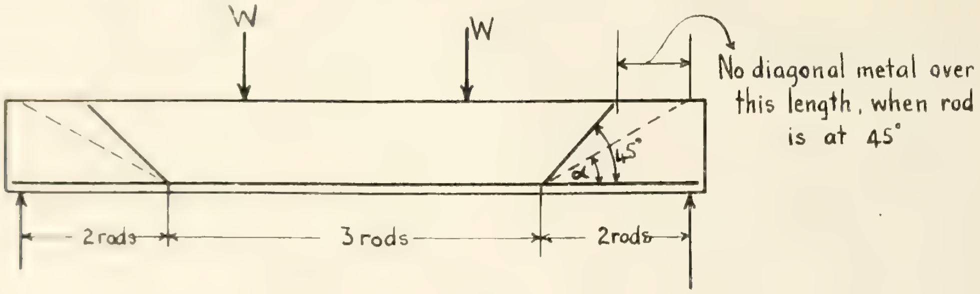


Fig. 16

Design of Typical Floor Unit of Reinforced Concrete Building

Suppose a floor to be divided into floor units measuring 17 ft. by 20 ft. and assume the live load to be 125 lb./sq. ft. It is required to find suitable dimensions and reinforcement for the floor.

Fig. 17 shows the floor unit, consisting of main girders AB, CD in the form of Tee beams, Tee beams (1), (2) and (3), and a floor slab reinforced in the direction pq.

Assumed Stresses, Bending Moments, Etc.

Safe compressive stress in concrete = 650 lb./sq. in.
Safe tensile stress in steel = 16000 lb./sq. in.
Max. shear stress in concrete = 120 lb./sq. in.
Modulus ratio, steel to concrete = 15

Bending moment $\frac{Wl}{12}$ to be figured at the ends and centre of uniformly boaded beams, and a reasonable allowance to be made for the fixture of the ends of main girders, such as AB.

Load Estimate

Floor slab (assumed 4" thick, at 150 lb./sq. ft.)	=50 lb./sq. ft.
Filling and board finish, say	=30 lb./sq. ft.
Live load	=125 lb/sq ft.
Total	205 lb./sq. ft.

Then considering 1 ft. width of slab of span 8 ft. 6 in. the total load = 205 x 8.5 = 1742 lb., and the moment of the load $= \frac{1742 \times 102}{12} = 14820$ inch. lb.

Following the method explained in the first article, the slab thickness necessary for the above load can be calculated, and if in agreement with the value assumed in estimating dead load, the design need not be re-calculated.

If d = slab thickness to steel, then the neutral line at depth xd from the furthest compression layers is given by

$$\frac{xd}{15(1-x)d} = \frac{\text{stress in concrete}}{\text{stress in steel}} = \frac{650}{16000}$$

giving x = 0.379.

Then $kd = d\left(1 - \frac{x}{3}\right) = 0.874d$, and if A sq. in. of steel are required to resist the bending moment 16000 A.kd = 14820 inch lb.

But 16000 A = total compression on 1 ft. width.

$$= 12\ xd \cdot \frac{650}{2} = 3900\ xd \text{ lbs.}$$

Therefore, 3900 xd . kd = 14820

$$\text{giving } d^2 = \frac{14820}{3900 \times 0.379 \times 0.874} = 11.5$$

$$\text{or } d = 3.4''$$

Hence the floor thickness would be about 3.4 + 0.75 = 4.15 or say 4¼ in. if about ¾ in. of concrete be allowed below the rods. This thickness is very close to the original estimate included in the load and no re-calculation need be made.

The steel area required per foot width of slab is then given by

16000 A. kd = 14820

$$\text{or } A = \frac{14820}{16000 \times 0.874 \times 3.4} = 0.31 \text{ sq. in.}$$

3 — ⅜-in. round bars give A = 0.33 sq. in.

Hence ⅜-in. round bars, spaced about 4-in. c. to c. would afford approximately the necessary reinforcement. These bars would run continuously along the lower face of the slab, Over the Tee beams (1), (2) and (3), there may be placed some tension reinforcement on the upper face of the slab to take the reversed bending moment at the ends. The length and spacing of such bars would be found from the bending moment at the ends, and involves no new principle. Practice could be easily standardized in such a matter.

Design of Tee Beams. General Notes

The cross section along x x in Fig. 17 is as shown there. It becomes necessary to decide as to the width of floor slab which is to be counted on as being an integral part of the Tee beam, acting as its compression flange. Such an estimate is necessarily approximate, and is based on the results of experience and of laboratory tests. The standard American specifications state that the width so acting with the Tee beam is to be taken as the smaller of the following values:—

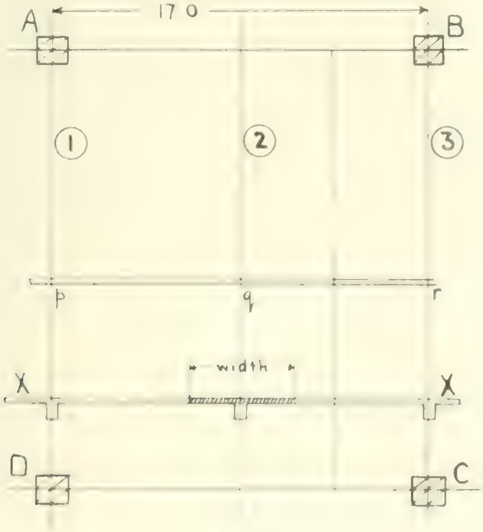


Fig. 17

(a) Total width shall not exceed one-fourth of the span length of the beam.

(b) The overhanging width on either side of the web or stem of the Tee shall not exceed four times the slab thickness.

The above values can only be taken where the slab is bonded adequately with the main beams as determined above.

In the case in question the span is 20 ft. and condition (a) gives total width of compression flange = 5 ft. Condition (b) gives a total width of eight times the slab thickness + the width of stem, i.e., 34 in. + width of stem. The latter will be considerably less than 2 ft. and hence condition (b) governs.

The depth of Tee beams cannot be defined within any very close limits of variation. The ratio of depth of Tee to width of its stem may range from 2 to 3 under average conditions, but may be as high as 4 for large beams. On the other hand, if headroom be limited, it may be governed by the condition which makes provision for the limitation of the shearing stress intensity, as already mentioned above. The rule that depth in inches = span in feet has been suggested, and may apply in some circumstances, but could not be adhered to rigidly. Turneaure and Maurer, in their treatise on reinforced concrete, develop a formula giving the economical depths for different stem widths, basing their calculations on the relative cost of steel and concrete in place in the beam. This must be a very variable factor, as stated by the authorities quoted, and no definite and binding limits can be laid down. The deeper the beam, the less the amount of steel required to resist a given bending moment, but the greater the amount of concrete, and material used in forms, and the smaller the headroom. Hence a saving in one direction is at once offset to some extent by a greater cost in other directions, and no rules other than the above general ones can be stated.

Moment of Resistance of Tee Beam

Fig. 18 shows the variation of stress over the flange of a Tee beam in which the neutral plane lies below the lower face of the floor slab, as is usually the case. Neglecting the small amount of compression on the area of the stem of the beam between the neutral plane and the lower face of the slab (area shown shaded in figure), the depth of the neutral line can be shown to be given by

$$xd = \frac{b_1 d_1^2 + 2Acd}{2b_1 d_1 + 2Ac},$$

the various quantities being given in Fig. 18 and c being the modulus ratio of steel to concrete. This result is found in a similar manner to that corresponding to it for a rectangular beam. (See first article of series). The resultant compression force in the flange acts at a distance z below the upper face of the slab, and is obviously through the centre of gravity of the trapezium shaped figure PQRS. z can be shown to be

$$\frac{d_1}{3} \cdot \left\{ \frac{3xd - 2d_1}{2xd - d_1} \right\}$$

the value of xd being as above, and then the moment of resistance = Af (d—z) where f = stress intensity in the steel rods, Af = total steel force and (d—z) = lever arm of steel force.

The above formulae would be cumbersome in practice, and it is customary to modify them so as to give a very simple method of computation. The compression stress in the concrete flange decreases from the upper face of the slab towards the lower face, and hence the resultant compression force acts above the layer which is half way through the slab thickness. If it be assumed that the resultant compression acts along a line half way through the slab thickness instead of as above, then the value (d — z) is obviously decreased. Hence since the steel force required to resist a given bending moment is equal to $\frac{\text{bending moment}}{[illegible]}$, the steel force must increase as (d—z) decreases. Thus a larger amount of steel would be required at any given unit stress, and the error made in assuming the resultant compression force to act half way through the slab thickness will result in a provision of steel which will err on the side of safety, if at all. The conditions are such that any very refined computation is utterly out of place, and hence the [illegible] approximation may be made. Any [illegible] subject ought to evaluate the values of xd. and z given in the formulae above, and see in what degree they would lead to results differing from those given by the much simpler approximation. It would be found that under ordinary conditions the differences made would be insignificant. Any cases departing from the normal must be checked by the more rigorous method.

Calculation for 20 ft. Tee Beams

Some reasonable values for depth and width of stem must be chosen tentatively and the necessary reinforcement determined. Should this be satisfactory as regards ease of grouping in the beam, and should the ends of the beams figure satisfactorily, the dimensions calculated might be adopted; but in practice it might be advisable to have depths of beams suited to facilities for construction of forms, etc., and in such cases appropriate figures can be easily chosen.

Assume for purposes of explanation that the total depth of the beam from upper face of slab to steel is 24 inches, and allow 2 in. covering of concrete below rods, making 26 inches in all. If the stem is 12 in. wide, its approximate weight per foot run would be 275 lb.

Load on Tee Beams One, Two and Three

Live load and floor panel dead load = 8.5 x 205 = 1740 lb./ft.

Estimated weight of stem of beam 275 lb./ft.

Total 2015 lb./ft.

$$\text{Moment on Tee beam} = \frac{(2015 \times 20)\ 20 \times 12}{12} = 806{,}000 \text{ in. lb}$$

$$\text{Distance from steel to centre of slab} = \left\{ 24 - \frac{4\frac{1}{4}}{2} \right\} = 21.87 \text{ in.}$$

$$\text{Therefore steel force, required} = \frac{806000}{21.87} = 36900 \text{ lb. which}$$

$$\text{may be carried by rods of section } \frac{36900}{16000} = 2.31 \text{ sq. in.}$$

5—¾-in. round bars give 2.21 sq. in., while 5—13/16-in. give 2.59 sq. in. Using the latter arrangement, the rods could be placed in one layer and leave adequate space for the aggregate in the concrete to pass freely to the bottom of the forms when the beam is poured.

Ends of Tee Beams One, Two and Three

The above reinforcement refers to the centre of the beam. As explained in a previous article, three of the above rods would be bent up so as to run along the upper face of the beam, while two would run continuously through the lower face. Additional rods would have to be placed near the upper face, so as to provide for the reverse moment where the Tee beams pass through the columns or through the main girder A B. Probably two additional rods would be so placed, and the reinforcement at the ends would then be as shown in Fig. 19. It becomes necessary to check the ability of the section so reinforced to resist the moment of 806000 inch lb., which is estimated to come upon it.

The method of determining the stresses due to the application of such a moment is as follows:—

The upper face of the beam being now in tension the Tee beam is virtually a rectangular one having two rods embedded in its compressive area, Fig. 19. The distance between the upper and lower layers of rods is 22 in. and the depth of concrete in compression must be determined. Suppose it to be x inches.

Then the rods in compression are (x—2) inches from the neutral plane, while those in tension are (24—x) inches away.

Therefore,

$$\frac{\text{Tensile stress intensity in steel}}{\text{Compressive stress intensity in steel}} = \frac{(24-x)}{(x-2)} = \frac{f_1}{f_2} \quad \ldots\ldots (1).$$

A second fact to be expressed is that the total tension = total compression. There is an area 12x sq. in. of concrete over which the average stress =

$$\frac{\text{max. compressive stress}}{2} = \frac{f_c}{2}$$

and a steel area of 1.04 sq. in. on which the stress intensity

$$\text{is } f_2 = f_1 \left\{ \frac{x-2}{24-x} \right\}. \text{ from equation (1)}$$

Hence since the total tension = 2.59 f_1 the equality of total tension and total compression is expressed by

$$2.59\ f_1 = 12x \,.\, \frac{f_c}{2} + 1.04\ f_1 \left\{ \frac{x-2}{24-x} \right\}. \quad \ldots\ \ldots\ \ldots\ (2)$$

A third fact to be expressed is that the moment of resistance = 806000 inch lb.

The resultant compression force in the concrete acts at a distance (24—x/3) inches from the tension rods, while the compression in the steel rods acts 22 inches away. Taking moments about the tension rods the equation becomes

$$806000 = 1.04 \left\{ \frac{x-2}{24-x} \right\} f_1\ 22 + 12x \frac{f_c}{2} \left\{ 24 - \frac{x}{3} \right\} \ (3).$$

A fourth fact is that the ratio of the compressive stresses in concrete and steel is given by $\frac{f_c}{f_2} = \frac{x}{(x-2)\ 15}$, 15 being the modulus ratio. This relation, with that of equation (1), when substituted into equation (2), will give the value of x. The various steps in the solution of the equation need not be given here, but x would be found to be 8.9 inches.

Equation (3), along with the above relations between the various stress intensities, will then give values of f_1 and fc. The results given are f_1 = 14350 lb. sq. in. and fc = 560 lb. sq. in.

Both these values fall within the limits laid down and hence the section may be considered adequate. Should the concrete stress run excessively high, which might be the case, a rather deeper beam might be substituted, although some excess above the limit laid down for the stresses at the centre of the beam might be reasonably allowed for reasons given later.

Main Girders AB and CD, Fig. 17

These girders must be designed to carry a concentrated load at the centre equal to the load on each Tee beam of the 20 ft. span, i.e., a load of 20 x 2015 = 40300 lb. In addition, the weight of the stem of the girder itself will produce a bending moment. If the stem were about 14 inches wide and the girder 30 inches deep, the weight of stem would be roughly 400 lb./ft.

Bending Moment on Girder

$$400 \text{ lb. per ft. gives} \frac{(400 \times 17) \times 17 \times 12}{12} = \frac{Wl}{12} = 115{,}600 \text{ in. lb.}$$

$$\text{The concentration at the centre would give } \frac{40{,}300 \times \text{span}}{4} \text{ if}$$

$$\text{both ends were free, and } \frac{40{,}300 \times \text{span}}{8} \text{ if both ends were fixed.}$$

Take a compromise between these at say 3/16 x 40,300 x span, i.e., their mean value, since the amount of end fixture may not be sufficient to reduce the central moment to a value 40,300 x span/8. The moment would then be (3/16 x 40,300 x 17 x 12) = 1,538,000 inch lb. and the total moment would be (1,538,000 + 115,600) = 1,653,600 inch lb. The American specifications merely say that "special consideration is also required in the case of concentrated loads," and the compromise to be made between the moments arising when the ends are (a) free, (b) fixed, is left to the judgment of the designer.

The depth of 30 inches having been assumed, the thickness of concrete below the rods, and half the slab thickness must be deducted to give the effective lever arm of the steel force. Take this deduction as $\left\{ 2 + \frac{[illegible]}{2} \right\} = 4.12$ in., giving the lever arm = 25.88 inches.

$$\text{Therefore, steel area required} = \frac{1,653,600}{25.88 \times 16000} = 4.00 \text{ sq. in.}$$

This would require 7 -- ⅞ in. round bars = 4.20 sq. in. or 5 -- 1 in. bars would give 3.94 sq. in., which comes very close to the requirements. The former arrangement could not be grouped in a single layer, and the lever arm might then be less than 25.88, as the centre line of the steel would be somewhat further from the lower face of the beam. This would increase the area of steel required. Any combination of bars giving the required area, and suitable for grouping in the beam, both as regards spacing and adaptability to bending up to resist shear, may be adopted. Following a similar process of reasoning to that explained fully above in the case of the 20 ft. Tee beams, the end section of the main girders may be checked to ascertain the stresses which would arise under the bending moment at the ends. This may be taken to be

$$\frac{40,300 \times \text{span}}{8} + 115,600 \text{ due to the weight of the weight of the stem} = 1,142,600 \text{ inch lb.}$$

It would be unreasonable to take as high a moment as 3/16 (40,300 x span) at the ends, since the moment when the ends are completely restrained is only ⅛ (40,300 x span). The constant 3/16 was used as the centre, since lack of complete end constraint would result in a greater bending moment than ⅛ (43,000 x span) at centre. If the end section be computed for the above moment of 1,142,600 inch lb. the stresses should not be allowed to run in excess of 650 lb. sq. in. in the concrete, and 16000 lb. sq. in. in the steel, since the above moment will be reached [illegible] good continuity in the construction. If a higher moment be assumed, some excess of stress beyond the above values may be allowed, the amount being a matter of judgment.

Shear at Ends of Tee Beams

For the 20 ft. beams the end shear = 10 x 2015 lb.
= 20150 lb.

Hence the intensity of shear stress given by the formula deduced at the commencement of the article is

$$q = \frac{V}{[illegible]} = \frac{20150}{12 \times 21.88} = 76.8 \text{ lb. sq. in.}$$

$$\text{For the 17 ft. girder the end shear} = \left\{ \frac{[illegible]}{[illegible]} + \frac{[illegible]}{[illegible]} \times 400 \right\}$$

23550 lb., giving a shear stress $= \frac{[illegible]}{\text{bkd}} = \frac{[illegible]}{[illegible] \times 25.88} =$ 65.[illegible] lb. sq. in.

Both these values fall well within the limit of 120 lb. sq. in., which is the greatest value allowed in the Standard specifications. As mentioned earlier, the limitation of depth due to headroom conditions is the only factor likely to give an abnormal value for the shear stress intensity, and may entail a greater width of beam than would be necessary if the grouping of the steel only were considered.

The American standard specifications say "In the design of Tee beams acting as continuous beams, due consideration should be given to the compressive stress at the support. The matter is obviously left to the judgment of the designer, and in considering the question it must be remembered that the bending moment has been figured for a clear span equal to the distance from centre to centre of columns or main girders. The columns would be at least 2 feet square in such a building and thus the restraining influences on the ends of the Tee beams extend for an appreciable distance inwards from column centres towards the beam centre; whereas the ends are theoretically fixed by an external couple applied outside the ends. Hence the bending moment to which the Tee section just outside the columns or main girders will be subjected is somewhat less than the theoretical amount at the ends. Then again, the end constraint may not be such as to give rise to the full theoretical end moment, and hence such a combination of circumstances is held to be a justification for allowing the stresses at the ends, computed as above, to run to somewhat higher values than those allowed at the centre. Taylor and Thompson in their treatise on reinforced concrete design suggest an allowance of 15 per cent. in excess of the stress values assigned at the centre. A bending moment diagram might be drawn for the clear span centre to centre of columns, and by considering the distance to which the columns extend along the span, the reduced moment to which the Tee section is subjected [illegible]

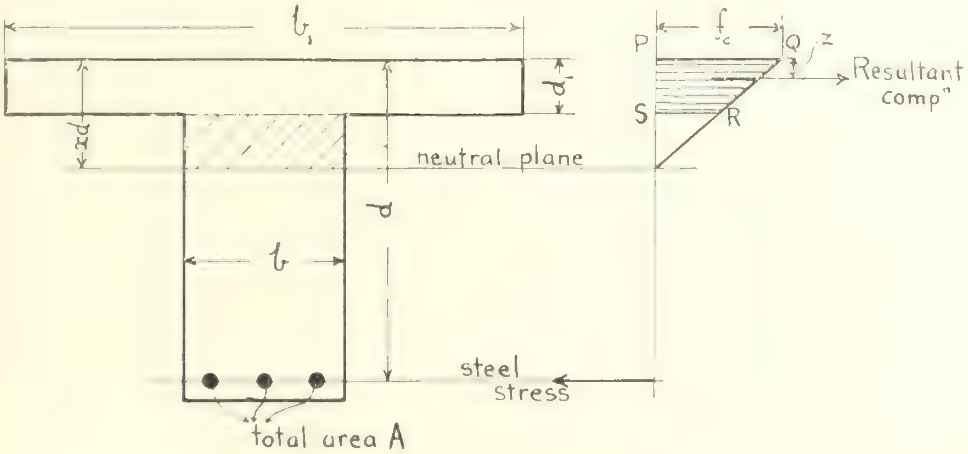


Fig. 18

expedient to make such allowance. The American specification that 'due consideration' shall be given to the question, will probably result in a satisfactory computation in the hands of a person of good judgment, and any attempt to arrive at a closely estimated stress in such circumstances is altogether unjustifiable. It might well be that a rather narrower and shallower beam than that above would figure satisfactorily for the moment in question, but as the principle of the method of computation is the same in all cases no other alternative need be considered. The shallower the beam the greater the amount of steel required, and a satisfactory balance must be struck in practice bearing in mind all the conditions which affect the dimensions of the design, such as relative cost of steel and concrete, cost of forms, head-room restriction, etc., etc.

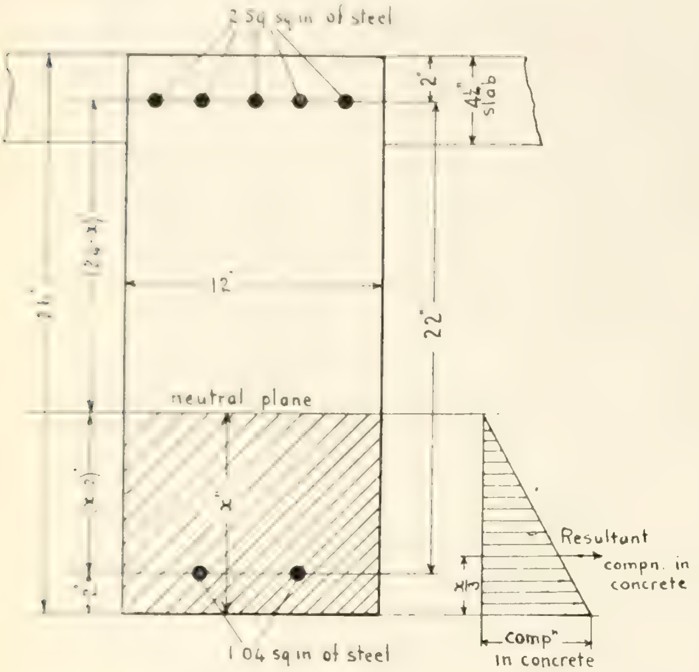


Fig. 19

The method of reinforcing the 20 ft. Tee beams to resist shear will be given in the next article, along with a brief note on the computation for the columns. This article will conclude the series.

Montreal City Surveyor's Report

Mr. J. R. Barlow, city surveyor of Montreal, has issued his report for 1911. This shows that a considerable amount of sidewalk work ordered to be done by day labor was not completed owing to shortage of labor and lack of necessary material. The total amount of expenditure during the year was $2,167,139. Of this $1,035,297.63 was expended for administration out of the revenue and $1,131,841.88 was spent for permanent works out of the loan fund. 12.48 miles of permanent sidewalks were constructed during the season at a cost of $140,791.59 for 58,500 square yards. Only 6.95 miles of pavement were constructed by the department as against 11.75 miles in 1910. The average cost of these pavements was as follows: Asphalt by contract, $3.52 a square yard in 1910, $2.11 in 1911; scoria blocks, $3.67 in 1910 and $3.70 in 1911; and granite blocks, $2.14 in 1910 and $3.38 in 1911. The total amount of paving done by contract was 53,016 square yards, at a cost of $112,339.82, and the amount done by day labor 82,819 square yards, at $307,180.14.

Mr. H. Auclair, the engineer in charge, suggests that the city should obtain a properly equipped asphalt plant in the northern part of the city, which would save money by allowing the new streets to be permanently paved with asphalt instead of macadamizing them. On streets recently opened on which the traffic is rather light, a six-inch concrete base covered with two inches of asphalt, would be quite sufficient, says this report, and in such a street where there would be practically no excavation to be made the cost would be about $1.50 a square yard.

The cost of removing snow from the sidewalks amounted to $134,907.32, and of removal from the streets on which cars are operated was $151,515.67.

Messrs. Morrel and Nichols, landscape architects of Minneapolis, have submitted tentative plans for a beautification scheme to the city of Edmonton. It is for 50 years ahead and will mean the ultimate expenditure of $20,000,000. The plan, which has been copyrighted by the municipality, covers the proposed extension of the city into rural districts, and a large residential district.

The Machinery Users' Association (Incorporated) of London, England, have decided to appoint a committee of enquiry to visit Canada with a view to investigating the facilities which this country offers for the establishment of industrial undertakings, and as to the best method of promoting a closer relationship between the industrial and commercial interests of Canada and the United Kingdom.

After two years' illness, Mr. William McNally, senior partner of the firm of William McNally & Company, has died in Montreal, aged 57. He was an importer and dealer in drain pipes, cement, contractors' supplies, &c., and did a large business throughout the Dominion. He was a member of the Canadian Society of Civil Engineers.

In view of the opposition of the inhabitants, the Montreal Tramways Company have abandoned a franchise for constructing waterworks at St. Laurent, granted by the Quebec Legislature.

The Quebec Government have doubled the subsidy granted to the North Railway Company, which will construct a line from Montreal to James Bay. The company will now have a grant of 8000 acres per mile south of the Transcontinental and 10,000 acres north of that line. The North Railway has, however, to be completed in three years for the section north of the Transcontinental and in fours for the other part of the route.

Among the projected buildings in Montreal are two fine hotels—one on Stanley street, by Mr. E. J. Adamson, and the other by Ross & Macfarlane, for a New York syndicate. It is to be situated on Beaver Hall Square, and is estimated to cost one million dollars. It will be ten storeys, and the largest hotel in Montreal. Plans for some further ten storey buildings are also being prepared. One is the Drummond on Peel and St. Catherine streets, of which Mr. H. C. Stone is the architect; another is to be on Phillips Place, the plans being by Mr. C. Brandeis, consulting engineer. A big apartment house is also to be erected on the corner of Dorchester and Matthew streets; the architects are Douchette & Morissette. The owner is Mr. Hebert. There will be accommodation for 110 tenants, and the cost will be $500,000.

Mr. T. W. Lesage, the superintendent of the City Works of Montreal, has taken action against Rabbi Gordon for $10,000 for libel. The action is in connection with the breakdown in the waterworks, and Mr. Lesage states that his reputation as an engineer having been attached he wishes to vindicate himself.

Tunnelling Design and Construction

Engineering Fundamentals—Notes on Surveying, Ventilation, Track, Plant, Excavation, etc.—The Practical Work Discussed

An exhaustive paper on tunnelling was read by Mr. S. P. Brown, Managing Engineer, McKenzie, Mann & Company, anl Chief Engineer of the Canadian Northern Montreal Tunnel and Terminal Company, Limited, at a meeting of the Canadian Railway Club, Montreal.

Mr. Brown first of all dealt with the historical phase of tunnelling, and spoke of the three classes of railway tunnels—rapid transit, entries into cities, and main line tunnels. The Mount Royal Tunnel of the C. P. R., Montreal, is an instance of the second class.

Mount Royal Tunnel

The Canadian Northern is just completing its Transcontinental System, for which central terminal facilities in Canada's principal city are essential, especially as the city is the main eastern seaport during the busiest half of the year.

Montreal's natural location, between the St. Lawrence River and Mount Royal, made the problem of entry appear complicated. To enter from either end of this narrow strip meant a detour that was undesirable, and might possibly have resulted in two separate stations for the east and west-bound traffic. Grade crossings were out of the question. Cut, cut and cover subway, or elevated viaduct would have necessarily been of considerable length, which would have been difficult and expensive in many ways. The natural alternative was a tunnel; and as by developing the country back of the Mountain, suburbanly, for Montreal's rapidly increasing population much of the expense of the improvements could be covered, it was the only logical course. Furthermore, the topography of the city—combined with the distribution of business activity of different sorts—made the actual terminal location, yards, etc., equally logical and simple.

The line of the Canadian Northern Montreal Tunnel & Terminal Company, Limited, from its junction with the main line of the Canadian Northern Quebec Railway—near the Jacques-Cartier Union Railway—is depressed through the new town of Mount Royal to the tunnel portal, where it passes under the Canadian Pacific Railway's belt line, about a mile from their Outremont yard. From this point the tunnel goes down at a 0.6 per cent. grade, in an almost due easterly direction, to the McGill College grounds, where it curves into McGill College avenue, which leads to the main passenger terminal, situated in the blocks between Cathcart and Lagauchetiere streets and Ste. Monique and Mansfield streets. The grades and elevations are such that this tunnel passes under St. Catherine street with ample room for a future rapid transit subway above it, and the tracks are able to be carried level through the station and over the lower town on the proposed viaduct, where a yard for light and perishable freight is contemplated, to connect with the proposed Harbor Commissioners' elevated and a possible bridge across the St. Lawrence River.

Two tracks will run both east and west from the main passenger station. The tunnel is something over three miles long. The viaduct about one mile long. The passenger station yard will be about a quarter of a mile long, with platforms over 1000 feet long and an area of about nine acres. Local passenger stations will be situated down town and back of the Mountain, as traffic demands. The main yard will be located near the Back River, where the electrical transfer yard will also be situated. There will also be a delivery yard in Mount Royal and an elevated yard in the commercial part of Montreal.

Surveying

Tunnel surveys are very similar to ordinary railway surveys, except that a far greater accuracy is required than is ordinarily necessary in surface work.

In location, the objective points being determined, the actual lines and elevations are influenced, in a city, very greatly by surface structures and conditions, while in open country sub-surface conditions are usually of greater importance. Geologists can sometimes predict what is likely to be encountered along general lines with a fair degree of accuracy, but the only way to determine sub-surface conditions in advance with any certainty is by core borings along the actual tunnel lines, and then the result is far from positive. The tunnel surveying can be divided into three parts: surface surveying, shaft work and sub-surface alignment. Mr. Brown described these methods in detail.

Design

The design of tunnel cross sections is too complicated to be more than touched upon in this paper. Except in special cases—such as where the cover is thin or the ground semi-liquid—the pressures are impossible to calculate and the strength of the lining, where used, is usually adapted to each case by the engineer, whose judgment is based on the character of the ground and conditions and what has been found by experience elsewhere to be safe under similar circumstances.

The cross section of the tube depends upon many things, the most important of which, perhaps, are the character of the ground and surrounding conditions, the length of the tube and consequent air resistance, the type of track construction, the motive power to be used in operation, the material used in construction, the system of ventilation to be used, the character and amount of traffic, the number and purpose of electric ducts required, protection from damage in case of derailment, the egress of passengers in case of an accident and, last but by no means least, the cost. It is seldom that two tunnels are found that are exactly alike and it is very often that several cross sections and kinds of structure are found in one tunnel. All the above influences overlap, interlock and conflict in so many ways that it is seldom, if ever, that an ideal cross section can be devised that will fully satisfy all conditions and requirements. Fortunately, however, many of the above "influences" may be made corrollary to the adopted design, so that the final result is quite satisfactory.

The designs for the Mount Royal Tunnel are not yet completed, but it is probable that both twin tunnels and double track sections will be used, depending on the ground. Where the rock is of the proper character to permit it, the tunnel may be left unlined, although this cannot yet be determined.

The minimum clearance has been limited to 16 ft. 6 in. above the rail, but the standard tunnel clearance will be 17 ft. 6 in. The standard clearance in width is 6 feet off the center line of track, which may be slightly reduced near the bottom as, for instance, at station platforms.

In the twin tunnel, centre walk ways will be provided at about the level of the coach floors, and cross passages will be cut through the dividing wall, at intervals, for communicating between the twin tubes. Refuge spaces are allowed under the walk ways for track men. The ducts will be carried in the center wall. The relation of the train cross section to the tube area will be approximately 50 per cent. In the double track section the two tracks will be separated by the duct bench, which is the same height as the center walk ways in the Twin Tunnel, so that in case of derailment one train cannot block both tracks.

The studies of electrification have not yet been completed, so that there is not much to be said on this subject. Owing to the climatic conditions outside the tunnel, it is improbable that a third rail will be used on the ground, which will probably force the adoption of some form of trolley. This means high voltage, either direct or alternating current. Great strides have been and are now being made in high voltage, direct current railway work and, until very careful and exhaustive studies have been completed, no decision can be made. This is important in the final design of tunnel cross sections, as the amount of head room for 10,000 volts alternating is quite different to that required for 1,500 volts direct current.

Ventilation

Tunnels are ventilated in many ways, the best methods being largely a question of opinion, although conditions govern to some extent. When fresh air is forced into a tunnel from the end the draft is usually against steam traffic and with electric traffic where possible. The Saccardo system, used for instance in the St. Gothard and Tauern tunnels, consists of an exaggerated injector. The tunnel tube is reduced to a minimum cross section at the portal and jacketed so that there is an annular space, about the inner tube lining, which reduces in area as it enters the tunnel. The other end of this annular space is closed, except for a connection to a powerful blower plant. The inner and contracted portion allows the air from the annular space to enter the tunnel all around the tunnel tube at a very high velocity. This rapidly moving air draws more fresh air through the regular tunnel portal and creates a heavy draft through the tunnel in that direction. Another system used in the Simplon is to close the portal with a steel curtain after the entrance of a train and force air into the tunnel behind it. The London Underground lately installed a plant to ozonize the foul air and re-use it.

In single-tube tunnels, where the cross section is small, compared with the bulk of the trains, and where all traffic is in one direction, the piston action of the trains, themselves, gives excellent ventilation if the portals or openings are free. In some cases the tunnel air is exhausted, usually near the center of the tunnel, either by exhaust fans or through a shaft, allowing the fresh air to enter at the portals. When the traffic is not large and coal-burning locomotives are not used, the problem of ventilation is often insignificant, especially if the tunnel is short, or its grade such as to tend to help natural ventilation.

Track

The permanent track in a tunnel is a matter open to serious discussion. As in many cases, this cannot be renewed without taking up the track, it has to be installed in the most permanent manner possible and, as a large track gang is seriously endangered by passing trains, every provision must be made to maintain grade and alignment with as little labor as possible. One of the commonest forms of track construction is to use creosoted ties with screw spikes and tie plates laid in rock ballast. Sometimes the alignment may be maintained by long ties. In Europe often cast-iron chairs are used instead of tie plates.

Another method occasionally used, especially at and near stations where cleanliness is particularly essential, is a concrete base, with creosoted blocks set in the concrete, on which tie plates and screw spikes are usually used. The main advantages of this are that the grade and alignment are fixed and the wooden blocks are easily renewed.

Construction

For purposes of general construction classification, tunnels may be divided into four main types:

1st.—Cut and cover methods which are particularly adapted to rapid transit subways through city streets where the usual traffic must be maintained and the depth is not great.

2nd.—Sub-aqueous tunneling, under bodies of water or through extremely soft and flowing ground, saturated with water.

3rd.—Soft-ground tunneling, where timbering is required during construction and a permanent lining for the finished tunnel.

4th.—Rock-tunneling where the ground is hard and little or no timbering is needed during construction.

Type 1 usually occurs where surface traffic has to be maintained. The street is ordinarily opened up for about half its width, and if the traffic is very heavy this opening is made during hours of least traffic, commonly at night and decked over for use during the busy hours of the day. With this method the sills and rangers under the decking are so placed as to fit the general scheme of posts and trusses to be developed as the excavation progresses. After the timber street surface is down, shafts or openings are made along the side, usually in the sidewalks or the edge of the street, and the earth excavated from under the timber, posting or trussing up the road sills as they are undermined, until the full subway excavation is completed.

With this system sewers, water and gas pipes, electric conduits, and other sub-surface structures are usually maintained on the timber work without being disturbed. Where surface or elevated tracks have to be maintained, the loads and supports are centralized as much as possible by trusses and heavy girders. Of course, each job is special in itself, but the general principles are common. After the tunnel is built the trench is backfilled, the timber removed as far as possible and the street surface restored.

Type 2 usually requires compressed air as a supporting medium for economical and safe construction. In pneumatic tunnel work, the modern method consists primarily of an air lock, from which a metal tube most commonly is extended, at the end of which is a steel shield, having a cutting edge like an old fashioned doughnut cutter. This shield is propelled by hydraulic jacks, braced against the lining already in place.

The locks are usually three in number, two being for material cars on the tunnel grade, and one above, for emergencies and through which the men can enter the tunnel when the material locks are busy. A lock is merely a chamber with a door in each end. These doors open against the pressure so that one cannot be opened until the air pressure on both sides has been equalized.

The tube ordinarily consists of cast-iron segments which bolt together and form a ring from two to three feet long, in the direction of the tunnel. The length of the rings determine the length of a shove on the shield, as the shield is only advanced enough each time to allow the next ring to be erected.

The shield itself is built in compartments, with doors so arranged that when the material in front is very soft or fluid, the shield may be forced through it without excavation, like a snow plow. Where the ground is hard enough to require excavation, or where rock is encountered in part or all of the cross section of the tube, the men work in front of the shield, the top cutting edge extending in front enough to protect the men from falling debris. The shield also has an annular tail piece of metal that extends behind, covering the last ring, so that the men working inside the shield are thoroughly protected.

The two greatest dangers in sub-aqueous tunnel work are first, men locking out of the air too fast and getting an attack of the "bends;" second, from "blow-outs," where the high pressure air escapes, permitting the water and flowing ground to rush into the tunnel. This is usually caused by uneven densities or cover in the ground, through which the shield is passing.

Crown Bar, Segment and Cap Systems

In type 3, soft ground tunnels, when air pressure is unnecessary or inadvisable, timbering is usually resorted to. This is of very varied form, but in general there are three practices: crown bars, segments and caps.

The crown bar system, commonly used in very heavy ground, consists of bars—usually of wood—set up parallel to the axis of the tunnel and poling boards driven outside them, almost tangentially to the surface of the tunnel excavation. The crown bars are supported by posts and rakers, so arranged as to best suit the nature of the ground and the methods of excavation and lining.

The segment timbering system—used in lighter ground—consists of a series of timbers, cut in segments, approximately to fit the form of the tunnel cross section, when set up in a plane vertical to the tunnel axis. The poling boards are driven outside the segments nearly parallel to the axis of the tunnel. The segment timbers are ordinarily self-supporting. This system is often used where only the roof is soft and the segments can be sprung directly from plates on the rock walls.

The cap and post system is very similar to the segment system, except that the segments are not self-supporting. This system is used in very heavy ground and posts and rakers are used similar to those in the crown bar system. Where the ground is very heavy, or where conditions require it, two, or even the three, systems are grafted on to each other, to fit the special case.

When the crown bar system is used, a small top heading is driven in advance; often with one or more bottom headings, from which the section is developed laterally. In the case of the segment or cap system the center top heading is seldom used, except for exploration purposes. Normally, the upper part of the tunnel section is excavated for its full width, so that each cap or segment may be erected complete as the work progresses. A heading is invariably a cap and post proposition.

In some cases, when ground and circumstances make it advisable, a shield is used without compressed air and all timbering is avoided. A roof shield was used in the subway tunnel, under part of Tremont street, Boston, without air with good success. A shield of this type is similar in many respects to a pneumatic shield. If a cast-iron lining is not used, cast-iron rods or some solid form of column is usually imbedded in the masonry lining, on the line of the jacks, so that the shield may be shoved ahead promptly after each ring of lining is completed, without waiting for it to set. When a roof shield is used, the side walls are usually built in side headings, well in advance, as supports for the shield.

Many years ago when tunneling was not so common as it is to-day, certain methods of excavation and lining tunnels in bad ground were developed in connection with a particular method of timbering and became common to that locality. In this way the terms "English Method," "Austrian Method," "Belgian Method," etc., developed. To-day these terms are practically lost sight of and each case is studied and developed by whatever method, or combination of methods, [illegible] best adapted for the ground condition and surrounding circumstances. The old classification of methods is in general as follows:

The so-called English system is a crown bar system, pure and simple, although segments are often put in between the crown bars to stiffen them. Here the full excavation is removed before any masonry is put in.

The Italians, who are perhaps the best tunnel men in the world, have adopted a system similar to the Belgians of carrying the arch as close as possible to the breast of the excavation. Both a top and bottom heading are used and the lower part of the tunnel is usually excavated after the arch is in place. In extremely bad ground, the arch and invert are sometimes excavated and built almost simultaneously from the two headings, the intermediate side walls being put in last. In every case, however, the masonry is kept as close to the breast as possible. This system, developed on account of a form of sulphurous rock, which commences to swell soon after it is brought into contact with the air and moisture and, when once started, continues to swell, regardless of tunnel lining. Dr. Louigi, the President of the National Society of Engineers and Architects at Rome, told the writer of one case where they had lined a double track tunnel three times—the last time with 10 feet of masonry. This tunnel has now distorted so that two trains cannot pass in it.

In the Mount Royal Tunnel, where soft ground is encountered, a cap and post system will probably be used, owing to the location of the rock surface; this running in general fairly near the roof line permits the full width timbering to be done without shifting posts, which rest directly on the rock. As fast as the roof excavation can be carried on in this manner, the arches will be built, so that the roof will be absolutely protected. After the arches are in, the lower excavation will be removed and arches underpinned, where necessary.

Design of Plant

In designing construction power plants, careful studies must be made of the conditions to be met with, in order to produce the greatest reasonable operating economy for the least possible first cost. As the plant is only temporary, expensive fuel and labor-saving devices cannot usually be installed, as they would not have time to pay for themselves, unless this saving is large. On the other hand, a good quality of machinery is usually the best investment, even at a materially increased cost, since its saleable value at the end of the job is so much greater. Similarly, standard machinery is easier to dispose of than special equipment. Plant buildings are always of the cheapest form of construction, to answer the requirements of the case in hand. Duplicate machinery must usually be installed in critical places, so that if a unit gets out of order the job will noe be shut down. In sub-aqueous tunnels under air pressure, everything connected with the air supply must be duplicated, or installed in such excess of the tunnel demand, that no accident within the range of human probability could cause a failure of air in the tunnel.

In the outside work, the usual motive power is direct steam; i. e., steam-driven shovels, cranes, locomotives, drills, etc. In shaft work, or inside the tunnel steam gives great inconvenience, owing to the blinding vapor and the gases of combustion. For these reasons air compressors are usually installed near the shafts and portals, while the outside and preliminary work is being accomplished, so that air power can be used in the tunnel proper. Where this is impracticable or uneconomical, electricity, or sometimes high water pressure, is used to drive the drills and pumps. In many European tunnels [illegible] is often used, entirely, or in conjunction with machine work.

The drills used are mainly of three types: rotary, such as the Brandt water drill, made famous by its use in the [illegible] hammer drills, where the drill steel is slowly revolved under the blows of an air hammer, and the [illegible] or piston drill, where the drill steel is reciprocated and revolved with the piston of the drill. The tendency in modern drill practice is now to use hollow steel, with a water jet mixed with air through the steel, which automatically cleans the hole. This materially increases the efficiency of the drill and reduces both labor and delays.

The transportation in tunnel construction is usually handled by electric, gasoline or compressed air locomotives, although sometimes mules are used on short hauls. Mules are especially useful in spotting cars in the headings, at mixers and in special positions, because, owing to their wonderful sagacity they quickly learn what is expected of them and require no drivers or attention. In tunnel transportation equipment height and width are of paramount importance, and muck cars are always kept as low as possible, so that a mucker can shovel into them at maximum efficiency. The wheel base is usually short, the gauge narrow and axle springs, or their equivalent, are valuable on account of reducing derailments resulting from poor track.

The modern practice of ventilating tunnels under construction is by the plenum system; i. e., by forcing fresh air into the working areas under pressure from blowers situated near the shafts or portals. In air-driven work, the exhaust from the drills, etc., aids the ventilation materially, especially in the headings where permanent air lines cannot be maintained on account of the blasting. In special cases where gases heavier than air are encountered in workings which do not drain naturally, exhaust fans are customarily used, often in conjunction with the regular Plenum blowers. Often where possible bratices are erected, or even double headings driven and cross connected at intervals to give a continuous circulation of air.

The repair plant on a large tunnel job is of vital importance. Even in a city, where shops are accessible, it is wise to have a rather complete repair shop on the job, as often delays occur in outside shops over which the tunnel man has no control and, as all money spent in tunneling is dead capital until the tunnel is completed, every moment counts; a few days' delay would often cost more than the shop.

The elaboration and justifiable cost of a construction plant depends largely on the size of the job, or series of jobs, upon which it can be used, the cost and availability of proper labor, the market for second-hand equipment when the plant is to be disposed of, and the time of completion.

In some parts of Europe, where labor is cheap and plentiful, very little money is expended, unless the time factor is of great importance.

The Mount Royal Plant

The plant for the Mount Royal Tunnel will be quite complete. The compressor plants at each end consists of one direct-connected cross compound unit of 2,200-cubic-feet-per-minute capacity, driven by a synchronous motor and three belt-driven cross compound units of 1,100-cubic-feet-per-minute capacity, with induction motors. The power is three phase, 62½ cycles at 2,200 volts. Pumps, drills and some small motors are run by air. Most power used, however, is electrical. The drills used are the precussive type with the water attachment built largely of steel, to reduce their weight. Horizontal bars are used to support the drills, and carriages are being made to handle the full drilling outfit for each heading.

The muck cars are 3 feet gauge, very low and narrow. They are built with a three foot wheel base, 18 in. wheels and springs on the axles. Both gasoline and electric locomotives will be used.

Part of the tunnel muck will be crushed for concrete stone and ballast; part being used for fill and sub-foundation work. The crushers are gyratory and roll hammer types, to give the desired grades, and both revolving and oscillating screens will be used over the bins.

The cages used at the shafts are of the counter-balanced automatic-dumping types, with electric hoists. These are designed for a capacity of about 800 cu. yds. per day.

The shops consist of a blacksmith shop, equipped with an air hammer, shears, punches, drill-sharpening machinery and the usual forges; machine shops equipped with large and small lathes, a shaper, radius drills, saws, pipe machine, emery and grindstones, etc.; carpenter shops, with band and circular saws and drill repair and testing shops, as well as garage for the maintenance, storage and repairs of automobiles and auto trucks.

Excavation

In the rock tunnel the procedure in excavation varies materially in different places and for different conditions. In America the most common practice is to take out a top heading the full width of the section and about half its depth, leaving a bench that can be drilled and shot out in one operation. In wide tunnels, however, a narrow center heading is sometimes driven at the top of the section in advance, after which the wing walls and bench are shot out. This system is usually followed where the ground is doubtful, as it gives an opportunity for inspection.

In European tunnels, many systems are followed, but usually a bottom heading is driven, from which the full-sized excavation is developed. Very often a top heading is driven in connection with this bottom heading. The progress attained in the heading work of some of these European tunnels has been very remarkable, far exceeding anything ever produced in America under any conditions, but the speed and economy, obtained in the headings are only too often nullified by practices developed in broadening out to the full-sized section, and in the masonry work.

The main advantage in the American system—as the top heading and bench method may be termed—is that in good ground a steam shovel may be used which somewhat decreases the overall cost of excavation. It is almost the universal custom in America to use columns for drill supports in the headings, with tripods on the benches. Occasionally men are found who use a horizontal bar for these drills in America, but this is the exception; as, for instance, the Laramie-Poudre tunnel, which now holds the American record of 653 feet driven in one month.

The writer has had occasion and opportunity to study different tunnel practices quite extensively at first hand, both in America and Europe, where he spent considerable time investigating the reasons why European tunnel progress had so far exceeded anything that had ever been attained in America. The four things that stand out most sharply in all tunnels where great progress has been made, are: first, the opening heading is always comparatively small and usually in the bottom of the section; second, a horizontal bar is used to support the drills instead of columns; third, spit or time fuses are used instead of electric fuses for firing the headings, and, fourth, short rounds are drilled and shots are fired often.

Every little economy in time is practiced and all delays, no matter how trifling, are analyzed and corrected, when possible. Workmen are given a bonus for extra progress above a specified minimum and machinery, such as drill carriages, are used where it is found advantageous. In this way the progresses are made that have seemed almost incredible to men working in our tunnels on this continent. The record in the Simplon of 685 feet in a month was considered remarkable, but a few years ago 1,013 feet was driven in one heading in one month through limestone in the Loetschburg tunnel.

The European engineers, like our western miners, like to get under the muck, so that much of it falls into the cars by gravity, instead of having to be lifted in. Sometimes this is accomplished by stoping and sometimes by driving a top heading directly above the bottom heading. The one important point is to keep the bottom heading open for traffic at all times, so that the heading progress is never materially affected. The full size excavation can be carried on over jumbo timbers at as many places as necessary to keep up with the heading.

A bottom heading in bad ground is possibly even more desirable than in rock, as, by this method the heading can be driven ou rapidly and the timbering work and full-sized section developed with care and without hurry in many places simultaneously along the line.

A great many mechanical drilling, excavating and mucking devices have been devised and, in some cases, found to work advantageously, but where the space is confined and delays serious, the laborer, with his pick and shovel is usually employed. One man can handle a good deal of muck in his shift, shovelling off of slick sheets into low cars.

The method of excavation adopted in the Mount Royal Tunnel is a bottom center heading, with breakups at intervals where the full-sized tunnel section will be developed.

The heading is driven by the horizontal bar method Later, a carriage and other auxiliary apparatus is expected to be used, as described under plant.

At the breakups, jumbo timbers will be placed in the heading so that traffic can be maintained and the upper portion of the tunnel stoped down on the top of this and run direetly into cars in the heading by gravity. As many as these breakups will be opened as are found necessary to keep up with the heading progress.

The firing is done electrically, but an effort is being made to get some special fuses with electric igniters, by which the cut may be fired electrically, at the same time igniting the time fuses of the relievers and line holes. This should give a better result than the ordinary time-fuse method, without its accompanying risk, and will relieve the men from the necessity of going back into the smoke to load the later rounds.

In the Mount Royal Tunnel, at present, the average progress at the west end is 20 feet per day. In the east end, where the ground is rather bad, requiring timbering, and where no shooting is allowed at night, on account of public annoyance, the average progress for the last two months was 12 feet per day. Heading 9 x 12 feet, 4 cubic yards per foot. No drill carriage; precussive drills used with water attachment. 24 in. gauge temporary muck cars still in use.

Lining

In tunnels that are lined at all, it is usually done with timber, rubble masonry, brick work or concrete. The timber work is of the segment type, usually, similar to that described in soft ground excavation. Rubble and brick work are paid up by hand, and is a very convenient form of lining in bad ground, where there is much timbering in the way. Concrete work is more mechanical and has greater possibilities of economy, because much of it can be done by machinery. The forms used are of wood or steel, and usually of some collapsible design, so that they may be slacked off, moved ahead and used again.

Depositing concrete through pipes, by compressed air, like grout, has been tried and it is said, has at last been accomplished by a company in New York. If this is true, tunnel concrete will be nearly doubled in usefulness and enormously decreased in cost.

Even to-day with our improved methods and machinery, tunnel work is slow and expensive, at best, but when we look back over the struggles of the tunnel diggers of times long past, we are not so much inclined to complain.

Mr. H. P. Kennedy of Toronto, announces that a harness factory, costing between $60,000 and $100,000, will be erected in north Edmonton early in 1913.

Latest figures show that the rolling stock of the Grand Trunk Railway now includes 1273 locomotives, 1,132 passenger cars and 39,855 freight cars. The tractive capacity of the locomotives is more than 28,457,176 tons; while that of the passenger cars is between 45,000 and 50,000; and of the freight cars about 1,162,035 tons.

Messrs. H. L. Stevens and Company, architects and contractors of Calgary and Vancouver, have taken out a permit for the new Sherman theatre in Edmonton. The cost is placed at $270,000. The structure, for which the foundation is completed, will be fireproof and equipped with modern facilities.

A five-storey mill construction apartment house is to be erected on Robson street, Vancouver, at a cost of $100,000. Five stores will take up the ground floor space, while on the storeys overhead will be sixteen three-room suites and twenty-four two-room apartments. These apartments will be fitted up with disappearing beds, built-in buffets and desks and will be heated by steam. For the interior finish British Columbia fir will be used. Construction is expected to start January 1 and the building will be ready for occupancy about May 1. Mr. Emil Guenther is the architect.

The Ontario Government has been asked to pay $215,000 to the Algoma Eastern Railway, which has just completed its line connecting Sudbury with the Great Lakes at Little Current. The amount is the final payment of a bonus of $265,000, or $5,000 a mile on the 53 miles of line. A Government engineer has been sent north to make the necessary examination of the road before the subsidy is paid over. The Algoma Eastern secured its right to a subsidy under a charter granted to the Manitoulin and North Shore Railway many years ago.

The Government of British Columbia is proceeding immediately with the construction of a bridge over the Upper Nechaca River in addition to the large steel bridge to be erected by the Grand Trunk Pacific, which will provide for railroad traffic only according to present plans. Work on the first named structure will proceed as soon as the machinery and supplies which are being brought in from Quesnel can be got upon the ground. Arrangements are being made at Fraser for lumber for the construction camps and a big force of railroad men will be established there shortly. The G.T.P. right-of-way is cleared through the townsite and for several miles on either side.

The Quebec Legislature have passed the Government's good roads programme, which authorizes the Provincial Treasurer to contract such loans as may be necessary to carry out the purposes of the act, but the loans must not exceed the sum of $10,000,000, at a rate of interest of not more than four and a half per cent. The bill provides that those municipalities which take advantage of the act shall pay an interest charge of two per cent. on the sum of money supplied by the Government. The principal alteration from the good roads act of last year is that the Provincial Government and not the municipalities will borrow the necessary funds, which will then be [illegible]

The Proposed University for Vancouver—Results of Competition

IN a recent issue of this journal, brief announcement was made concerning the awards of the B. C. Provincial Government in the competition for designs for the University Buildings to be erected at Point Grey, Vancouver. The first prize of $5,000 went to Messrs. Sharp & Thomson, Vancouver; the second of $3,000 to Mr. D. Scott Bow, Vancouver; the third of $2,000 to Mr. P. J. Turner, F.R.I.B.A., and partner, of Montreal, and the fourth of $1,000 to Messrs. Symons & Rae, Toronto.

The University scheme, as stated in the regulations issued by the ministry, contemplates the erection of a small city capable of such treatment as will make it one of the most interesting and beautiful in the world.

The principal problem before the competitors was the placing and designing of the many buildings so as make the whole scheme harmonious and at the same time to take every advantage of the beautiful views obtainable from the site. The complete building scheme involves the expenditure of [illegible].

It will be noticed that the first and second places are given to Vancouver architects. It is therefore all the more gratifying to find the third place carried off by Mr. Philip J. Turner, who is well known to our readers as a contributor of articles on architectural subjects. His most recent article was on Fireplaces, published in our Annual Brick and Clay Products Number of December 18, 1912.

Mr. Philip J. Turner, Montreal

Mr. Turner received his architectural training in London, Eng., where for seven years he was principal assistant to the well-known architectural firm of Messrs. Chas. Barry & Son, Westminster, architects to the Houses of Parliament. For two years also he was associated with James Ransome, Esq., F.R.I.B.A., consulting architect to the Government of India. While in London, Mr. Turner was awarded the silver medal of the Architects' Association for obtaining first place in the examinations and lectures of 1899. Mr. Turner came to Canada in 1907. He is a Fellow of the Royal Institute of British Architects and holds the appointment of Special Lecturer in Architecture at McGill University.

In the Vancouver competition, Mr. Turner associated with himself Mr. Harris, of his office, entering the competition as Philip J. Turner and partner.

Mainly Constructional

The News in Brief—From Coast to Coast

The new sewage disposal plant for Stratford, Ont., is now practically completed.

The Provincial Government of Quebec have granted the township of Magog $25,000 for road improvement.

The new Orpheum theatre at Vancouver is expected to be opened on March 1st next. The cost will approximate $150,000.

Plans will shortly be prepared for a theatre at Edmonton to cost $150,000. The site is at Second street and College avenue.

Mr. A. S. Going has been appointed engineer of construction for the Grand Trunk Railway System, with office at Montreal.

The annual convention of the provincial branch of the Canadian Society of Civil Engineers was held at Victoria on December 14th.

The Canadian Fairbanks-Morse Company are erecting a seven-storey mill construction warehouse building at Vancouver, at a cost of about $150,000.

Plans will shortly be completed for the Klaw & Erlanger theatre at Vancouver which will be erected at a cost of approximately $500,000 and will accommodate 1400 people.

The Chadwick Brass Company, Limited, has purchased the business of Chadwick Bros., Hamilton, Ont., and the new company intend to double the present capacity of the plant.

The annual meeting of the Canadian Society of Civil Engineers will be on January 28-30. It is hoped that the members will be able to meet in their new building, 176 Mansfield street, Montreal.

Good progress is being made on the construction of the Willoughby-Sumner building at Saskatoon. This building, when completed, will be occupied by Mr. F. R. MacMillan as a department store.

Mr. Arthur N. Johnson, M. Am. Soc. C.E., State Highway Engineer of Illinois, recently delivered an illustrated lecture on "Cement-Concrete Highway Bridges," before the Graduate Students in Highway Engineering at Columbia University.

Mr. David White has been appointed chief geologist of the United States Geological Survey, succeeding Mr. Waldemar Lindgren, who has become Rogers Professor of Geology and head of the Geological Department of the Massachusetts Institute of Technology.

Mr. Charles Carey, Edmonton, is having plans prepared for an eight storey business and apartment building, 50 by 150 feet, to be erected on Seventh street. The structure, costing $145,000, will contain 167 three-room suites above the ground floor. Work is to begin early next spring.

Engineer A. D. Creer, who has charge of the work under the direction of Mr. Lea, recently stated that the first cost of the trunk sewer scheme for Greater Vancouver would be about $1,000,000 a year for five or six years with gradually diminishing annual amounts until the completion of scheme in 1950.

Announcement is made that the municipality of Edmonton will expend $6,000,000 for street railway, paving, park, waterworks and telephone extensions in 1913. One and a half million dollars will be used in improving the street railway system and a similar amount will be expended for paving about 30 miles of streets. The estimate for the water department is $320,000. Four new fire stations and equipment will cost $150,000. The stores and works departments require a similar amount of money.

Two million dollars is the estimated cost of the shops to be erected in Edmonton in 1914 by the Grand Trunk Pacific Railway Company, according to official advices received at that place. It is announced that the shops will be opened in 1914, when, it is expected the line will be in operation to the Pacific coast.

An advance compilation by the statistical department of the Winnipeg Industrial Bureau, shows that 71 apartment houses have been erected in 1912, representing an investment of $3,044,000. Nine of these buildings cost over $100,000 each, and the average for all apartment buildings erected this year is over $42,500.

The Hassam Paving Company of Worcester, Mass., have sent us an attractively illustrated publication descriptive of various work carried out by the company in recent years. The book is illuminating as to the possibilities of Hassam paving and its perusal will be well worth the while of engineers, city and town officials.

Messrs. Sharpe and Thompson, architects, of Vancouver, are the prize winners in the recent competition for designs and plans for the University of British Columbia. The amount of this prize money is $4000, in addition to the emoluments accruing from the construction of the buildings, which will probably cost $1,500,000.

Excavation work has been completed and construction will be rushed on a six-storey mill construction rooming house or hotel building on Howe street, Vancouver. It will have cost, when completed, $150,000. Buff pressed brick, trimmed with terra cotta, will be used for the exterior facings of the building which will occupy a lot 87 feet by 120 feet.

The Neptune Meter Company, 90 West street, New York city, are sending their customers and friends a New Year's remembrance in the form of a gilt-edged leather-bound pocket diary. This little book contains ample space for private memoranda. Its value is enhanced by a number of maps and a quantity of useful and practical information.

The Apartments, Ltd., has been incorporated with a capitalization of $300,000 to erect and maintain two high-class apartment houses in Edmonton. The buildings will be seven storeys in height, 45 x 120 feet, of fireproof construction. Work is to begin early next spring. Messrs. Magoon & McDonald, local architects, are preparing the plans.

Publications Received

The Christmas number of Chain Belt, the monthly publication of the Chain Belt Company, Milwaukee, Wis., is particularly interesting and diverting. There are a number of practical articles calculated to interest concrete users. Of these may be mentioned, "Contracting in Cold Weather"—a particularly timely subject. An illustrated description of the making of "Chabelco" chain belt is given.

Sewage Disposal in the United Kingdom, by H. Lemmoin-Cannon; published by St. Bride's Press, Limited, Fleet street, London; price, 7/6 net. In this work the author has endeavored to give a brief yet comprehensive outline of the present status of sewage disposal in the Old Country. The book is lucid and informative and will be found valuable by engineering students and others. The division of the work into short chapters, together with the analytical table of contents, facilitates reference. The foreword in commendation of the book is written by Sir Alexander Stenning, a past president of the Surveyors' Institution.

Structural Engineering, by Husband & Harby; London: Longmans, Green & Co. (Canadian agents, Renouf Publishing Co.); price $2.25. The authors have endeavored in this work to bridge the gap which has existed between the theoretical and the practical in recent books devoted to this subject. The main outlines of theory are stated and the application of such theory has been extended to the practical design of a variety of structures and structural details of everyday occurrence. A short summary of the properties of structural materials, etc., is given, with the idea of facilitating ready reference. The elastic beam theory is stated in an ample manner, while careful consideration is given to the subject of column strength. Masonry structures and types of engineering masonry are the subjects of particular attention.

Building Stones and Clay Products, a handbook for architects, by Dr. Heinrich Ries, Professor of Economic Geology in Cornell University; New York: Jno. Wiley & Sons; Canadian agents, Renouf Publishing Co., Montreal; price $3.00. The author of this book is well known in this country, having undertaken several important investigations for the Geological Survey. In his preface, Dr. Ries disclaims any attempt to present an exhaustive treatise, his aim being to take up only the more important occurrences of building stone and to deal with simply the fundamentally important facts. The first part of the book is devoted to building stones, with chapters on Rock Minerals and Rocks; Properties of Building Stones; Igneous Rocks and Gneisses; Sandstones; Limestones and Marbles; Slate, and Serpentine. In the second part of the book, which is devoted to clay products, the subjects of the various chapters are Properties of Clay; Building Brick; Architectural Terra Cotta; Hollow-Ware for Structural Work and Fireproofing; Roofing Tile; Wall and Floor Tile; Sewer Pipe, and Sanitary Ware.

The Automatic Survey Level

Among the new improvements being brought to the attention and use of the engineers of to-day, is the new Automatic Surveyor Level, recently invented by M. J. Dikeman, of New York City. This Automatic Level will not only take the grades, but will measure the horizontal distances, establish stations every 50, 100 or 200 feet, as desired, and produce a complete profile map of the line of survey. It is claimed that its design is so complete that it will do the work of the entire levelling party. These instruments have been under construction for several years, many designs being built before a perfect machine was obtained. While the instrument is quite complicated, the working and operation is very simple, and the entire work is accomplished by one man, in less than one-tenth of the time required by the usual surveying party; and without the liability of error or mistake

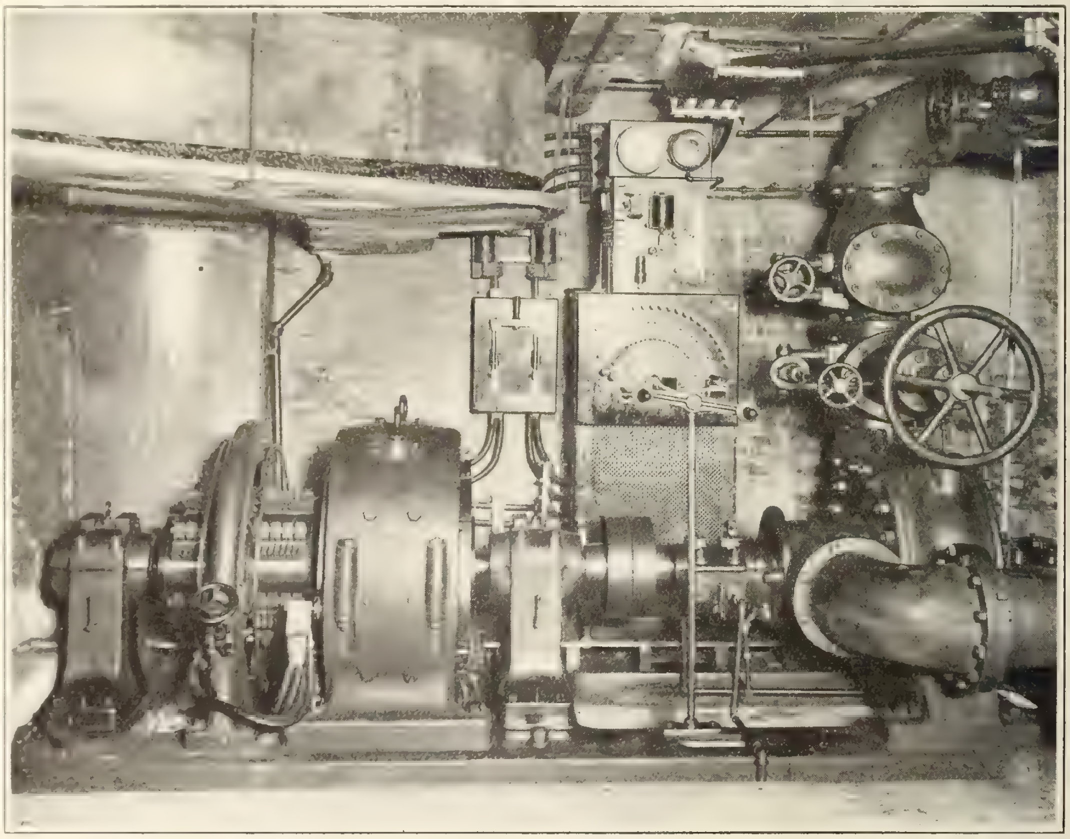
The level is an electrical instrument, mounted on a suitable vehicle, and after the record sheet is placed on the rolls, the instrument being adjusted or levelled, is ready for work, the entire record and data being taken by drawing the vehicle over the line of survey, making an instantaneous record of every thing over which it passes.

The principle upon which the instrument is designed, is based on the law of gravity. The various motions required to produce the records, are mostly obtained through the use of friction discs, governed and controlled by an electrical device, which increases, decreases, and reverses the motion regulating and controlling the recording device. The capacity of the level is from 15 to 20 miles per day, depending upon the condition of travel, and the roughness of the ground to be passed over. It is especially adapted to the preliminary surveys on any class of work and will be of great value in irrigation and railway work, although it is equally as well adapted to the usual classes of city work in paving, sewers, and general work. These instruments are being manufactured by the Dikeman Surveyor Company of Detroit, Mich.

New Electrically Driven Pump at Robert Simpson Company's Store, Toronto

The Robert Simpson Company of Toronto, have recently installed a special pumping equipment in connection with their hydraulic elevators, which has some interesting points. The set consists of a Siemens direct current 275 h.p., 250 volt 1475 to 1100 r.p.m. variable speed motor. The pump is an Escher Wyss two stage type, designed for raising 1500 Imperial gallons per minute against a total head of 415 feet. The set pumps into an accumulator, the efficiency of the pump being 76 per cent. The normal speed is 1475 r.p.m., but after a pressure of 415 feet is reached in the accumulator the set is automatically slowed down to 1100, when the pressure from the pump side drops and the check valve to the accumulator is closed, whereupon the pump runs idle.

The motor is provided with commutation poles and Siemens two-piece commutator with the brush gear supported in the middle from the bedplate. This arrangement is very satisfactory, as it is essential that there should be no vibration due to the high number of revolutions. Although the current in the motor varies from 90 to 900 amperes, when speeding up from light load to full load, the commutation is absolutely sparkless.



Pumping Equipment in connection with large departmental store—Toronto

It is a well known fact that the small clearances between the rotary and stationary parts of centrifugal pumps will not allow same to run for any length of time without the water passing through. In order to overcome this difficulty a new kind of relief valve (Escher Wyss patent) was designed, this valve operating automatically in such a way that as soon as the check valve to the accumulator is shut off, the relief valve is gradually opened so that a small quantity of water is discharged into the discharge tank and, consequently, a continuous flow through the pump is effected. In this way damage to the internal parts of the pump and the annoying noise and vibration, when the water is passing through the pump, is avoided; further, no water is wasted. When the pressure in the accumulator drops to a predetermined amount the motor is automatically speeded up to its normal r.p.m. The speed very seldom goes down to 1100 r.p.m., which proves that the set is working efficiently, or if it does reach the low speed, the time it remains there is only a few seconds.

This method of pumping in conjunction with a large system of hydraulic elevators is here used, we believe, for the first time, as it is the usual practice to start and stop the set altogether. The idea is that of Mr. A. Kirkaldy, the chief engineer to the Robert Simpson Company, and all the work was carried out under his supervision.

Among the various advantages gained by this scheme of pumping is that fairly steady pressure is obtained and the pump generally works at its full capacity, and consequently at high efficiency. The output in gallons is a little below that required when the elevators are all working so that in between times when they are not all working the pump has time to again build up the pressure within the prescribed limits. A further feature is that saving is effected inasmuch as the motor is not always starting and stopping, but is only slowed down slightly, depending upon the pressure in the accumulator. The area occupied by the set is very small, as it takes up only about one-sixth of the space required by the usual plunger pumps. The accompanying cut shows the complete pumping outfit as it is installed.

Arising out of certain over-expenditure on a fire station at Westmount, P.Q., a motion was made in the City Council calling for the resignation of Mr. A. Currie, the engineer. The motion was made by aldermen who have been severe critics of Mr. Currie. It was generally admitted that the entire council was to blame for the over-expenditure, and Mr. Currie's mistakes were ascribed to over-zeal in undertaking architectural work. The motion was voted down.

The North Railway Company, which contemplates the building of a railway from Montreal to James Bay, has secured a new subsidy of eight thousand acres of land per mile, not convertible in money, for the section extending from Montreal to the 837th mile, west of Moncton, on the Transcontinental Railway, and 10,000 acres per mile for the remaining 550 miles. The last subsidy of 5,000 acres per mile, granted by the province at the last session, proved to be insufficient. The company may become the owner of the mines and minerals in one fifth of the lands to be granted, to be selected by the company within five years provided it previously undertakes by contract to pay the Government twenty-five per cent. of the net profits.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Assiniboia, Man.
Gravelling road to cost $17,000, Portage avenue, planned by the municipality. Sec.-treas., Frank Ness, Kirkfield Park P.O. By-law carried.

Coteau Station, Que.
Macadam roads planned by Municipality Council. Tenders received by Sec.-Treas., G. E. Andre, until January 7, 1913. Plans and specifications at his office and with Minister of Agriculture & Roads, Quebec.

Fort William, Ont.
Improvements to Highways to cost $10,500 planned by city council. Clerk, A. McNaughton. Ratepayers will be asked to vote on by-law Jan. 6, 1913 Grading and gravelling from G. T. P. bridge on south side of the Kaministiquia river S.W. to the Twp. of Neebing, and S.E. to the Mountain road.

Owen Sound, Ont.
Street improvements planned by town council. Clerk, Chas. Gordon. Ratepayers will vote on by-law Jan. 6th.

Toronto, Ont.
Storm sewer system, cost $954,000, planned for the city. Mayor, H. C. Hocken, City Hall. Ratepayers will vote on by-law Jan. 1st, 1913.

Winnipeg, Man.
Sewers planned by Board of Control. Secretary, M. Peterson. Engineer, H. N. Ruttan, 223 James ave. Sewers in Boyd ave. from Parr street to C. P. R. tracks; Lansdowne ave. from Aikins street to W. Line Lot 14 Digby ave. from Glenwood Cres. to Sylvia street; Sylvia St. from Digby to N. Line Lot 10. Specifications at office of Engineer. Tenders received by secretary until Jan. 2, 1913.

Sewers, pavements, etc., contemplated by the Board of Control. Secretary, M. Peterson. Engineer, H N. Ruttan, 223 James ave. Plank walks on Carmen and Harrow streets, $509; asphalt No. 2 pavements on lane between William and Elgin ave., Tecumseh and Arlington streets, $4,566; sewers in Well street, $8,595; Livinia $2,198; Sargent ave. $4,186; McGregor street, $9,520.

Rivets and bolts for use in construction of pipe line for water supply. General contractor, The Manitoba Bridge & Iron Works Ltd., Logan avenue west, Winnipeg. Board of Control, Sec. M. Peterson. Engineer, H. N. Ruttan, 223 James avenue.

CONTRACTS AWARDED

Winnipeg, Man.
Hydrants to cost [illegible]. General contractor, The Canadian Fairbanks Morse Co., Winnipeg, at $37.06 ea. without pole case, 150 6-in. hydrants for domestic waterworks system. Board of Control, Sec., M. Peterson. Engineer, H. N. Ruttan, 223 James avenue.

Sewer pipe to cost $35,455; vitrified clay. General contractor, Thos. Jackson & Son, 370 Colony street. Board of Control, Sec., M. Peterson. Engineer, H. N. Ruttan, 223 James avenue.

Sewers, Ferry and Ness avenue, for Rural Municipality of Assiniboia. Sec.-treas., Frank Ness, Kirkfield Park, P.O., Man. Engineer, Mr. Rodgers. General contractor, Gillbeault & Co., 11 Provencher avenue, St. Boniface, Man.

Well drilling machine to cst $4229.50. one 18-in. McKierman Terry core drill. Board of Control. Sec., M. Peterson. Engineer, H. N. Ruttan, 223 James Ave. Contractor, Canada Foundry Co., 146 Notre Dame E.

Valves for domestic water service. Bd. of Control. Sec., M. Peterson. Engineer, H. N. Ruttan, James avenue. Contractor, McAvity & Sons; St. John, N.B.

Railroads, Bridges and Wharves Residences

Acton, Ont.
Grand Trunk Railway Company have been authorized to construct siding for Beardmore & Co. on Lot 27, Con. 3, Twp. Esquesing, County of Halton.

Blueface, Ont.
Canadian Northern Railway Company's location of station at Blueface, Twps. Capreol and MacLennan, District Sudbury, Ont., mileage 305.19, has been approved.

Dorchester, N.B.
Reconstruction and enlargement railway wharf. Tenders received by Sec. R. C. Desrochers, Ottawa; Dom. Govt., Department of Public Works, until Mon., Jan. 20, 1913. Specifications, etc., at offices of Geoffrey Stead, dist. engr., Chatham, N.B.; J. K. Scammell, dist. engr., St. John, N.B. Postmaster, Dorchester, at Dept., Ottawa, and MacLean Daily Reports Toronto and Montreal.

Eburne, B.C.
Station for the B. C. Electric Railway Co., 16 Hastings street E., Vancouver. Ground is being cleared for the building and trackage facilities. Plans in progress.

Kincardine, Ont.
Pier. Tenders received by clerk, P. A. Malcomson, until Jan. 27, 1913, for centre pier for Southampton Bridge. Plans, etc., at his office.

Lacombe, Alta.
[illegible] C. P. Ry. Co. have been authorized to construct Lacombe [illegible]

Moose Jaw, Sask.
C. N. Ry. Co. have been authorized to construct a bridge across and divert Main street by means of structure carrying a railway over highway, Moose Jaw Creek and private road.

Prince Albert, Sask.
Penstock, canal, etc., at La Colle Falls planned by city council. Engineer, C. H. & P. H. Mitchell, Traders Bank Bldg., Toronto, Ont. Tenders to be called for Hydro-electric penstock, canal excavations, tailrace excavations and concrete work. Plant to develop 15,000 h.p. Plans and specifications at office of engineers and city commissioners.

Quebec Harbor, Que.
Two locks and dam, St. Charles River, Dom. Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by secretary until Feb. 10, 1913. Plans, etc., at offices of J. L. Michaud, District Engineer, Merchants Bank Bldg., St. James St., Montreal; A. R. Decary, District Engineer, Post Office, Quebec; C. E. W. Dodwell, District Engineer, Halifax, N.S.; F. G. Goodspeed, District Engineer, St. John, N.B.; J. G. Sing, District Engineer, Confederation Life Bldg., Toronto, and at Department, Ottawa.

Selkirk, Man.
Drydock to cost $200,000 planned by Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. To be built as soon as possible.

St. Francois de Salle, Que.
C. P. R. Company's plans of proposed station and siding have been approved.

Twp. Oxford, Ont.
Grand Trunk Railway Company have been authorized to construct siding for the Beachville White Lime Co., Ltd., on Lot 17, Con. 2, Twp. Oxford, Ont.

Toronto, Ont.
Subways. The crossings of Front and Overend streets by means of subways has been approved; city to pave Mill street from Cherry street to Overend street Mayor, H. C. Hocken.

Vancouver, B.C.
Bridge, Georgia-Harris street, planned by city council. Clerk, Wm. [illegible] Con. engr., C. A. P. Turner, Can. Life Bldg., Winnipeg, Man. Plans and specifications at office of engineer. Tenders received by clerk until Jan. 13, 1913.

Station (False Creek) planned for C. N. Railway. Architect, company's architect. Work will start about June, 1913 about 3,000,000 cu. yds. of excavation to be done.

Winnipeg, Man.
Bridge planned for the Rural Municipality of Kildonan. Sec.-Treas., Harry [illegible]

[illegible] reso[illegible] to [illegible] to be erected to [illegible]

[illegible] for the Commissioners of the National Transcontinental Railway. Sec., P. E. Ryan, Ottawa, Ont. Machines, tools, appliances, motors, furnaces, cranes, etc., required for equipment of Car Dept. shops at Transcona, Man. [illegible] at office of W. J. [illegible] Bldg., Ottawa. Tenders received by secretary until Feb. 13, 1913.

CONTRACTS AWARDED

Brantford, Ont.

Bridges, culverts, etc., to cost $150,000, Port Dover to Galt. Lake Erie & Northern Railway Co. Chief engineer, Wm. P. Kellett. General contractors, Johnson Bros., Port Hope. Sub contractor, P. H. Secord & Sons, Brantford. Work to be done in spring.

Cap-A-L'Aigle, Que.

[illegible] to wharf to cost $29,330 (Charlevoix Co.) Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. General contractor, Nap. Trudel, St. Irenee, Que.

Montreal, Que.

Dredging at Longueuil. Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. General contractor, W. J. Poupore & Co., Ltd., Montreal, Que.

Moose Jaw, Sask.

Superstructure for bridge to cost $5,502 across Moose Jaw River. General contractor, The Sask. Bridge & Iron Works.

Ste. Adelaide De Pabos, Que., Gaspe Co.

Wharf to cost $6,485. Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. General contractors, A. & E. Nadeau, Grand Cascapedia, Que.

Ste. Victoire, Que. (Co. of Richelieu)

Wharf to cost $6,996. Dom. Govt., Department of Public Works. Sec., R. C. Desrochers, Ottawa. General contractors, Messrs. Chas. Papillon & Chas. Gouin, St. Ours, Que.

Sand Split Point, B.C. (Moresby Island)

Pile bent wharf to cost $4,375. Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. General contractor, Westholme Lumber Co., Ltd., Prince Rupert.

St. Thomas, Ont.

Round house for Michigan Central Railway. General contractor, Geo. A. Ponsford, 66 Centre street. The National Washout Co., Chicago, Ill., awarded contract at $15,000 to install complete system in round house for washing out locomotives.

Public Building, Churches, Schools, etc.

Brantford, Ont.

Drill Hall, cost $6,000, is under contemplation of the Dominion Government, Dept. of Militia & Defence. Sec., E. F. Jarvis, Ottawa. Town Council will donate site and plans will be prepared.

Cape d'Espoir, Que.

Tenders will be received until March 1 for the erection of a fog signal building, dwelling house and oil storage shed at Cape d'Espoir, Gaspe Co., Que. Plans, specifications and forms of tender may be obtained at the office of the Minister of Marine and Fisheries at Ottawa, or of the agency at Quebec and at the post-offices of Cape d'Espoir, Perce, Gaspe, Paspebiac and Port Daniel.

Eganville, Ont.

Post Office. Tenders received by Sec. R. C. Desrochers, Ottawa, Dom. Govt., Dept. of Public Works, until Jan. 13, 1913. Plans, etc., at office of Morris & Moore, architects and civil engineers, Pembroke, Ont.; Post Office, Eganville, and Dept., Ottawa.

Hamilton, Ont.

Club House to cost $7,000 in east end contemplated for Ward Eight Progressive Society (Wm. Kinch, 54 Frederick avenue). Architect not yet appointed.

Medicine Hat, Alta.

Y. M. C. A. building is contemplated. Chairman of Committee, Ald. Doty. Site 75 x 240 secured. Building to be used as Y. M. C. A. and public library. Plans to be prepared.

Oldcastle, Ont.

Church to cost $10,000 for Anglican Congregation. Rector, Rev. Dobson Peacock. Tenders received by Architects Leybourne & Whitney, Davis Bldg., Windsor, after Jan. 1, 1913. 1-sty., 80 x 37, concrete foundation, cement, brick and stone construction.

Oshawa, Ont.

Alterations to public building planned by Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Tenders received by secretary until Jan. 13, 1913. Plans, etc., at offices of Thos. Hastings, Clerk of Works, Postal Station F, Yonge street, Toronto, Post Office, Oshawa, and at Dept., Ottawa.

Prince Albert, Sask.

Mausoleum to cost $5,000 planned for S. McLeod. Architect, Eric Wojaughn, Agnew Block. 1-sty., cement foundation, white marble and tile construction, tile floors, marble finish. Tenders will be received by architect from Jan. 1, 1913, till Jan. 30, 1913.

Surrey Centre, B.C.

The School Board proposes to erect two schools next year. Plans will be prepared.

Sooke, B.C.

School. Provincial Government, Dept. of Public Works. Engineer, J. E. Griffiths, Victoria. Minister, Hon. Thos. Taylor, Victoria. Plans, specifications, etc., at Department, Victoria; at office of J. S. Muir, Sec. School Board, Sooke, B.C. Tenders received by Minister until January 9, 1913.

Vancouver, B.C.

Moving picture theatre to cost $75,000, Hastings and Carrall streets, planned for W. E. Dewees, Mgr. Princess theatre, 57 Hastings E. Owner has purchased building and will remodel it for the purpose.

Club rooms and office building contemplated for the North West Commercial Travellers Association. Sec.-treas., F. J. C. Cox, Travellers Bldg, Winnipeg, Man. Site has been purchased and plans will be prepared.

Victoria, B.C.

Hospital to cost $225,000 planned by city council. Clerk, Wellington J. Dowler. By-law passed to provide funds for construction.

Salt Swimming baths to cost $125,000, Douglas and Belleville streets, planned by city council who will make application to Prov. Govt. to issue bonds for construction, furnishing and equipment. Mayor, Beckwith.

Jail and police station to cost $40,000 planned by the city council. By-law will be submitted at the annual elections for jail and police station, also swimming baths.

CONTRACTS AWARDED

Brandon, Man.

Horse stable to cost $7,054 (Experimental Farm). Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. General contractor, Brandon Construction Co., Ltd.

Midland, Ont.

Public building to cost $47,700. Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. General contractor, E. A. Bleakney, Gananoque, Ont.

Sherbrooke, Que.

School, cost $28,000, for Catholic School Commissioners. Architect, J. W. Gregoire, 95 Wellington street. General contractors, Simoneau & Dion, Metropole Bldg. Electric lighting, hot water heating.

Toronto, Ont.

Church to cost $50,000 for Pauline Ave. Methodist Congregation. Pastor, Rev. Gilbert Agar, 65 Indian Grove avenue. Architect, J. H. Galloway, 23 Toronto street. Mason, Nobes & Baker, 8 Whitesides Place. Carpenter, H. H. Brown, 33 Perth avenue. Brick construction. Foundations in.

Theatre to cost $9,000, Bloor and St. Clarens avenue, for S. Bloom & Co., 978 Queen west. Architects, Redmond & Beggs, Kent Bldg. General contractors, Bell Bros., 39 Howard Park avenue. Brick and structural steel construction. Foundations in.

Business Buildings and Industrial Plants

Edmonton, Alta.

Wickerwork factory contemplated for S. H. Acklin, Worcester, Mass., who is negotiating with City Commissioners for site. Plans will be prepared.

Ft. William, Ont.

Grain exchange and offie building to cost $500,000, Victoria avenue, contemplated. Sec., Fred. Babe, Commercial Chambers. Architect, Carl Wirth. Plans will be completed in January. 12-sty., 120 x 100, reinforced concrete construction. 6 storeys to be built at present.

Hamilton, Ont.

Brewery contemplated for Schlitz Brewing Co., Milwaukee, Wis. Representative of company is looking for site and plans will be prepared.

Remodelling stores, King street west, for H. Levitt, 29 Victoria avenue. Architect not yet chosen. New store fronts will be built.

Montreal, Que.

Bottling plant, St. Viateur street, planned for The Farmers Milk & Produce Co. Ltd., 638 St. Catherine street west. Directors, J. G. Meagher, C. A. McNee, R. E. Coglands, D. W. Allen, W. F. Stephen and N. Sangster. Building not to be erected till spring.

Merritt, B.C.

Capt. John Leader has just purchased the McDonald Block and will build addition and install a heating plant.

Mirror, Alta.

Glass and enamelware factory. Mayor, H. J. Raymer, of Mirror, is negotiating with Cleveland syndicate regarding the establishment of their business here.

Ottawa, Ont.

Shop and residence, cost $5,200, Division, for Peter Surge, 536 Rochester. 31 x 45, brick veneer construction, cement foundation. Plans in progress.

Prince Albert, Sask.

Hotel to cost $250,000, Central avenue and 14th street planned for Marquis Hotel Co. Architects, Creighton & Crowther. 4-sty., cement foundation, stone construction, reinforced concrete, terra cotta, structural steel and iron and brick construction. Tenders to be called.

Stratford, Ont.

Upholstering factory planned by Chas. Farquharson & F. M. Gifford who are negotiating with city council regarding concessions, site, &c.

Vancouver, B.C.

Stable for the Pioneer Steam Laundry, 910 Richards street. Architect, Wm. Frederick Gardiner, 347 Pender street W. Three storeys, 30 x 120, brick, concrete and heavy mill construction, concrete floors. Tenders to be called at once.

Warehouse to cost $75,000, 5-sty., concrete and mill construction, Beattie St., for J. W. Gibb, 1273 Nelson street. Architects, Parr, McKenzie & Day, 570 Granville street. General contractor, W. H. Mueller, 407 Hastings street W., will receive tenders at once for about 1,000,000 feet lumber, cement and joist hangers. Other tenders will be taken later.

Winnipeg, Man.

Stable, Stella and Aikins street, for M. Tuff, 872 Main street. 1½-sty., brick construction, to accommodate 20 horses. Plans prepared.

Manufacturing plant. The Stover Gas Machine Co., c/o Winnipeg Industrial Bureau, will erect plant to manufacture soda and gasoline pressure tanks, etc.

Addition to Queens Hotel planned (Prop., T. Evoy). Architect, E. D. Tuttle, 701 McArthur Bldg. 3-sty. and basement, 26 x 60, frame construction. Tenders called for all trades except concrete and heating.

CONTRACTS AWARDED

Edmonton, Alta.

Warehouse to cost $40,000 for The Great West Supply Co. General contractors, The Western Home Builders, Ltd., 820 7th street.

Fort William, Ont.

Warehouse to cost [illegible], Simpson street for Cameron & Heap. Architect, R. E. Mason. General contractors, J. A. Girvin Co., 317 Portage avenue, Winnipeg. Work on construction of building will not be started until spring. 5-sty., 75 x 98, stone foundation, common and pressed brick, mill construction.

Wire fence factory, cost $40,000, Island No. 2 for Thomas Black, 76 Lombard street, Winnipeg, Man. Architects and general contractors, G. H. Archibald & Co., 827 Union Block, Winnipeg. Work has been stopped until spring.

Manufacturing plant, cost $100,000, for the National Tube Co. President, W. W. Near. Owner is architect. General contractor, M. H. Braden. Patent roofing, electric lighting, boilers, cranes.

Cold storage plant to cost $20,000, Hardisty street, for Gordon, Ironsides & Fares Co. Architects and general contractors, Seaman & Penniman. Plumbing, Superior Heating & Plumbing Co. Elec. work, Carter Jones. 2-sty., 44 x 66, electric lighting, refrigerating plant, freight elevator.

Storage tanks and warehouse to cost $20,000, McIntyre street, for Imperial Oil Co. Ltd. Architect and general contractor, S. J. McQueen. 1-sty., 300 x 60, cement and brick piles, reinforced concrete and brick construction.

Fraserville, Que.

Rest house to cost $5,000 for employees of Intercolonial Railway of Can. General contractor, Z. Ouellette.

Galt, Ont.

Stores. Owner and builder, N. R. Osburn. 2-sty., 66 x 32, stone foundation. Excavating started.

Hamilton, Ont.

Warehouse, Park and Merrick streets, for W. H. McLaren's Ltd., 25 McNab street. President, W. H. McLaren. General contractors, Christman & Co., Main and Hughson streets. Motors and electric equipment, Canadian Westinghouse Co., Ltd., $3,000.

Remodelling store sand apartments to cost $5,000 for J. Walter Gage, Main & Hughson streets. General contractor, D. A. Culp, 237 Emerald street N. Old building to be remodelled into stores and apartments, concrete foundations.

Warehouse and factory to cost $18,000 for Robertson Bros., 12 Mary street. Mgr., D. Fleming. Architect, D. J. Corrigan, 231 Catherine street N. General contractors, Alex. Milne, 67 Mary street. 2-sty. and basement.

Montreal, Que.

Manufacturing building to cost $24,000, Rue St. Dominique and Bernard streets, for Dominion Straw Goods Co., 15 Rue St. Pierre. Architects and general contractors, A. Filion & Frere, 865 De St. Valier. 3-sty., 40 x 40, stone foundation, brick construction, felt and gravel roofing. Foundations in.

Toronto, Ont.

Store and office, cost $2,900, 172-6 Dundas street, for G. A. Goddard, 383 Indian Road. Builders, Roberts Bros., 228 Dovercourt Road. Two storeys, brick, cement foundation.

Factory to cost $50,000, Osler and Pelham, for Samuel May & Co., 102 Adelaide street west. Engineers and builders, Standard Structural Co., 111 Manning Chambers. 4-sty., 133 x 52, cement foundations, reinforced concrete and brick, structural steel and iron construction.

Factory to cost [illegible] for [illegible] & Co., Ltd., Heintzman avenue. Engineers, T. Pringle & Son, 509 Continental Life Bldg. General contractor, E. H. [illegible] street. [illegible] cement foundation, reinforced concrete, brick and structural steel construction, [illegible]

Warehouse to cost [illegible], Adelaide and Peter streets, for [illegible] & Co., 62 Lombard street. Architects, Langley & Howland, Continental Life Bldg. Carpenter, Geo. Robertson, 230 Arthur St. Ptg. and heating, A. Welch & Son, 304 Queen street west. 6 storeys.

3 attached stores and residences to cost $9,000, St. Clair avenue. Architect and builder, J. H. Leslie, 2 Wright Ave. 2-sty., brick foundation and construction, galvanized iron. Plans drawn.

Warehouse to cost $35,000 for W. R. Johnston & Co., Ltd., York and Front streets. Architects, Gordon & Helliwell, 12 Richmond street E. Mason, John Aldridge, 273 West Marion street. Carpenter, S. B. Bagshaw, 505 West Marion St. Iron and steel, Dom. Bridge Co., Ltd., Imperial Life Bldg. 5-sty. and basement, cut stone, reinforced concrete, terra cotta and brick construction.

Walkerville, Ont.

Garage and factory, cost $18,000, Kildare road, for George Reid. Architects, Leybourne & Whitney, Davis Block, Sandwich street east. General contractor, H. Howe, Cataraqui & Devonshire streets. Carpentry, painting, glazing and roofing, Lambert & Braithwaite, 6 Riviere ave. Sandwich. Plumbing and heating not let. Iron work, Canadian Bridge Co. Three storeys, 119 ft. 3 in. x 50 ft., concrete foundation, brick, concrete and steel construction, prepared roofing, cement and maple floors, fire escapes and freight elevator required.

Bank building, Wyandotte road, for Merchants Bank of Canada. Architects, Hogle & Davis, 80 St. Francois Xavier street, Montreal. General contractors, Frost Winchester Co., Curry Hall, Windsor. Excavation, Thos. Chick, Bruce and Elliott streets, Windsor. 2-sty., 50 x 50, concrete foundation, brick and terra cotta construction.

Winnipeg, Man.

Office building to cost $900,000, Garry and Ellice streets, for Eastern Syndicate. Representative, G. W. Head. Architects, Ross & McFarlane, 928 Union Bk. Bldg. General contractors, Geo. A. Fuller Co., Union Bank Bldg. 2-sty., 50 x 120, concrete foundation, brick, tile, terra cotta and steel construction. Old building is being razed.

Residences

Montreal, Que.

Residences (alterations) to cost $3,800, Duluth street, for Jas. Plouffe, St. Lawrence Blvd. 3-sty., 66 x 29, brick construction, felt and gravel roofing. Plans drawn.

Twenty-four flats, cost $50,000, Cote De Neiges Road. Tenders will be received by architect, E. Payette, 103 St. Francois Xavier street, after Jan. 15, 1913. Four storeys, 250 x 250, triangle, cement fndn., pressed brick construction ornamental iron, gas and electric lighting, hot water heating, two passenger elevators.

Ottawa, Ont.

Residence, cost $3,800, for Douglas C. Grant, 72 Sparks street. 24 x 30, brick veneer construction, stone foundation. Plans in progress.

[illegible] for F. S. Johnson, [illegible] brick veneer construction, [illegible]

Continued on page 8[illegible]

Tenders and For Sale Department

City of Edmonton
Engineering Department

Invitation to Tender

[illegible] "Tenders for Trunk [illegible] to the City [illegible] Canada, [illegible] be received up to 6 p.m., **January 18th, 1913,** [illegible]

Contract No. 3.
[illegible] lin ft. 8-ft. dia. sewer.
2200 lin ft. 6 ft. 6-in. dia. sewer.
1950 lin ft. 4 ft. dia. sewer,
and accessories.

Contract **No. 4.**
6200 lin. ft. 4-ft. dia. sewer, and accessories.

Contract **No. 5.**
1200 lin. ft. 6 ft. dia. sewer.
4650 lin. ft. 5 ft. dia. sewer.
1620 lin. ft. 4-ft. 6-in. dia. sewer,
and accessories.

Contract **No. 6.**
1400 lin. ft. 6-ft. dia. sewer.
2050 lin. ft. 5-ft. dia. sewer.
3750 lin. ft. 4-ft. 6-in. dia. sewer.
3400 lin. ft. 4-ft. dia. sewer,
and accessories.

Contract **No. 7.**
4050 lin. ft. 4-ft. dia. sewer.
3500 lin. ft. 5-ft. dia. sewer,
and accessories.

Contract **No. 8.**
4700 lin. ft. 6-ft. dia. sewer.
4700 lin. ft. 5-ft. dia. sewer.
2450 lin. ft. 4-ft. dia. sewer,
and accessories.

Each tender must be accompanied by an accepted cheque, payable at par Edmonton, drawn in favor of the City of Edmonton to the amount of one (1 p.c.) per cent., of the tender submitted, as a guarantee that, should the work be awarded, the bidder is able and willing to enter into and carry out the contract.

Each bidder may tender on one or more or all of the contracts.

The lowest or any tender not necessarily accepted.

Plans and specifications may be seen at the offices of the City Engineer, Edmonton, Alberta, Contract Record & Engineering Review, Toronto, Canadian Engineer, Toronto; Engineering Record, New York, or a complete set of plans and specifications for any contract will be sent on a deposit of Twenty-five ($25.00) Dollars, and a set covering all the contracts on a deposit of One hundred ($100.00) Dollars. This deposit will be returned if plans and specifications are returned within fourteen (14) days of closing of tender.

51-1 CITY COMMISSIONERS.

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors and manufacturers read the "Contract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect.

No extra charge is made for filing plans at one or all four offices.

Contract Record and Engineering Review

Montreal—B34 Board of Trade.
Toronto—220 King Street West.
[illegible] Travellers' Bldg.
Vancouver—429 Pender Street.

Sealed tenders addressed to the undersigned, and endorsed "Tender for Wharf at Windsor, Ont.," will be received at this office until 4 p.m. on **Monday, January 13, 1913**, for the construction of a Wharf at Windsor, Essex County, Ont.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the offices of H. J. Lamb, Esq., District Engineer, Windsor, Ont.; and J. G. Sing, Esq., district Engineer, Confederation Life Building, Toronto, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signatures, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 16, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—32066. 52-1

Tenders for Dredging

Sealed tenders, addressed to the undersigned, and endorsed "Tender for Dredging, False Creek, Vancouver," will be received until 4 p.m. on **Friday, January 31, 1913**, for dredging required at False Creek, Vancouver, B.C.

Tenders will not be considered unless made on the forms supplied, and signed with the actual signatures of tenderers.

Combined specification and form of tender can be obtained on application to the Secretary, Department of Public Works, Ottawa, and to C. C. Worsfold, Esq., District Engineer, New Westminster, B.C. Tenders must include the towing of the plant to and from the work. Dredges and tugs not owned and registered in Canada shall not be employed in the performance of the work contracted for. Contractors must be ready to begin work within thirty days after the date they have been notified of the acceptance of their tender.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, for five per cent. (5 p.c.) of the contract price, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 27, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—33298. 1-2

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. **11-t.f.**

Tenders for Pier

Tenders will be received by the undersigned up to 5 p.m. **Monday, the 27th day of January, 1913**, for the construction of a Centre Pier in the Saugeen River for the Southampton Bridge. Plans and specifications for a Concrete Pier can be seen at the office of the undersigned. Tenderers may also tender for any other form of sub-structure provided tenderer furnish plans and specifications and general details therefor. Party whose tender is accepted to furnish satisfactory security for completion if required.

Lowest or any tender not necessarily accepted.

Tender to name date by which to be completed.

Marked cheque for five per cent. of tender to accompany each tender, which will be returned if tender not accepted.

(Signed) P. A. MALCOLMSON,
County Clerk,
Kincardine, Ont.

Sealed tenders addressed to the undersigned, and endorsed "Tender for Armoury, Port Arthur, Ont.," will be received at this office until 4 p.m. on **Wednesday, January 22, 1913**, for the construction of the building mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of the City Clerk at Port Arthur, Ont.; at the office of H. E. Matthews, Esq., Superintending Architect of the Dominion Public Buildings, Winnipeg, Man., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and places of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 27, 1912.

Newspapers will not be paid if this advertisement is inserted without the authority of the Department.—32702. 1-2

Sealed tenders addressed to the undersigned and endorsed "Tender for Post Office, Eganville, Ont.," will be received at this office until 4 p.m. on **Monday, January 13, 1913**, for the construction of a Post Office Building at Eganville, Ont.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of Messrs. Morris & Moore, architects and civil engineers, Pembroke, Ont., at the Post Office, Eganville, Ont., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 21, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—30517. 52-1

Situations Wanted

Graduate familiar with plant design seeks situation with consulting or contracting engineers. Has followed "shop course" with best electrical manufacturing companies. Has also two years experience in surveying. Speaks English and French. Best of references. Apply Box 673, Contract Record, Toronto, Ont. 52-1

[illegible] age 42, with life experience in the design and manufacturing of locomotive and derrick cranes, and other contractors' plant, seeks situation. Apply to Box 675, Contract Record, Toronto, Ont. 1-2

Situations Vacant

[illegible] Apply F. S. Baker, Traders Bank Building, Toronto, Ont. 1

City Engineer Wanted

Applications for the [illegible] to the City of Ottawa [illegible] of Control, will be received by the undersigned until 4 o'clock p.m. of **Friday, the 10th of January, 1913**. Applications to state qualifications and salary expected.

[illegible]
City Clerk.

Ottawa, December 20, 1912. 52-2

Water Works Engineer Wanted

[illegible] the Chairman of the Water Works Committee, [illegible] o'clock p.m. of **Friday, the 10th of January, 1913** [illegible]

[illegible]

Ottawa, December 20, 1912. 52-2

Sealed tenders addressed to the undersigned, and endorsed "Tender for Addition and alteration to Public Building, Oshawa, Ont.," will be received at this office until 4 p.m. on **Monday, January 13, 1913**, for the work mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of Mr. Thos. Hastings, Clerk of Works, Postal Station F. Yonge Street, Toronto, at the Post Office, Oshawa, Ont., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 21, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—30992. 52-1

Sealed tenders addressed to the undersigned, and endorsed "Tender for Locks and Dam, Quebec Harbour, P.Q.," will be received at this office until 4 p.m. on **Monday, February 10, 1913**, for the construction of two Locks and Dam in Quebec Harbour, Que.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the offices of J. L. Michaud, Esq., District Engineer, Merchants Bank Building, St. James Street, Montreal; A. R. Decary, Esq., District Engineer, Post Office, Quebec; C. E. W. Dodwell, Esq., District Engineer, Halifax, N.S.; F. G. Goodspeed, Esq., District Engineer, St. John, N.B., and J. G. Sing, Esq., District Engineer, Confederation Life Building, Toronto, Ont.

Persons tendering are notified that tenders will [illegible] forms supplied, and signed with their actual sig[illegible] residence. In the case of firms, the actual signature, the nature of the occupation and place of [illegible] given.

[illegible] cepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to five per cent. (5 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

[illegible]

By order,

R. C. DESROCHERS,
[illegible]

[illegible]

[illegible]

Harris Excavator

For sale, mounted on wheels for track, 18 cu. ft. Orange-peel Bucket, capable of digging to a depth of 20 feet. In good working order. Machine at present located in Montreal. Box 674 [illegible] 1-

A [illegible] desirable connections with a good reliable contractors' supply firm to handle their line of Concrete Mixers, Hoists, Elevators, etc. The line is well known and has a good sale in Canada. Apply with full particulars to E. J. MacIntyre, 4059 Perry Street, Chicago, Ill. 52-2

Reporter Wanted

Our report system gives in a concise, accurate, available manner just what information anyone handling building or engineering supplies or machinery must have to make sales. These reports are mailed daily to the leading supply houses, contractors and builders throughout Canada. We require a representative in a number of towns, and it is possible that we are unrepresented in yours, to report promptly and accurately news of sales opportunities in these trades. As it requires but a few moments daily to obtain the information our proposition should be looked upon in the nature of a side-line. Reply immediately to MacLean Daily Reports Limited, 220 King Street West, Toronto. 52-1

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope "Tenders for Valves," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following valves, F.O.B. Port Arthur:—

24-in. Gate Valves, equipped with operating gears	30
12-in. Gate Vales, without gears	9
24-in. Check Valves, with 3-in. by-pass ..	2

Specifications can be seen at the office of the City Engineer, Port Arthur, or the office of the Contract Record and Engineering Review, Toronto, Ont.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities

Corporation Offices, Port Arthur,
December 28th, 1912. 1-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope, "Tenders for Lapwelded Steel Pipe," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following Lapwelded Steel Pipe, F.O.B. Port Arthur:—

24-in. Pipe, 5-16-in. metal, Bell & Spigot joints, 40,200 lineal feet.
24 in. Pipe, 5-16-in. metal, flanged joints, 2,700 lineal feet.
24 in. Pipe, ¼-in. metal, flanged joints, 2,700 lineal feet (Alternative)
[illegible] lineal feet.

[illegible] as per list furnished with the specifications.

Specifications can be seen at the office of the [illegible] Arthur.

[illegible] per cent. of the contract is required as a deposit.

[illegible]

[illegible]
Commissioner Utilities

[illegible]

tion, pine floors, felt and gravel roofing. Plans in progress.

Prince Albert, Sask.

[illegible] to cost $[illegible],000, for [illegible] [illegible]. Architect, "National Builder," [illegible] Magazine. [illegible] storeys, cement foundation, frame construction. Plans in progress.

Saskatoon, Sask.

Apartment block, cost $[illegible],000, 4th ave. and [illegible] street, for Saskatoon Commission Co., 21st street east. Architects, Thompson & Crockart, Masonic Temple. Three storeys and basement 50 x 135, cement foundation, [illegible] & Bedford stone and pressed brick construction, maple floors, metal ceilings. Plans drawn.

Toronto, Ont.

Residence to cost $5,000, 41 Hambly avenue, for H. J. Atkinson, 22 Leuty ave. Brick and cut stone construction, brick foundation. Plans drawn.

Residence to cost $3,800, Manor Rd. and Oswald Cres., for N. J. Schell, c/o Dovercourt Land Co., Adelaide street. Architect, Craig & Madill, 304 Manning Chambers. Brick foundation, brick construction, shingle roofing. Plans drawn.

Apartments to cost $6,000 for Wm. Phillips, Bloor and Brunswick avenue. Architects, Redmond & Beggs, Kent Bldg. New tenders will be received. 3-sty., brick foundation, brick and stone construction, felt and gravel roofing.

Residences to cost $16,000, Ascot Ave. for J. W. Clara, 446 Indian road. Stone foundation, brick construction, shingle, felt and gravel roofing. Plans drawn

Alterations to residence for John Stone, 116 South Drive. Architects, Burke, Horwood & White, 28 Toronto street. Tenders received for extension of present heating and lighting system. Brick construction, oak floors, slate roofing.

CONTRACTS AWARDED

Brantford, Ont.

Residence, Hart street, for Mrs. Annie Stevenson. Builder, Frank A. Burr. One and three-quarter storeys, 18½ x 34, brick clay construction, cement foundation, pine floors, shingles on asbestos roofing. Work to start at once.

Hamilton, Ont.

Residence, cost $2,500, for Mrs. F. W. Brennan, 474 Main street east. General contractors, Hysert & Hildreth, 188 Gibson ave. 2½ storeys, brick construction. Permit granted.

Residence to cost $3,000, Balmoral Ave. Owner and general contractor, J. H. Housego, 18 Wood street west. 2½-sty., brick construction.

Residence to cost $3,000. Owner and general contractor, J. A. Jones, general delivery. 2½-sty., brick construction.

4 residences to cost $16,000, Emerald street. Owners and general contractors, Seymour & McKay, 10 Augusta street. Brick construction.

Residence to cost $2,900 for W. McFarlane, 30 Victoria avenue N. General contractors, W. Hobson & Son, 313 Emerald street N. 2½-sty., brick construction.

Residence to cost $3,400 for Wm. Widdicombe, 130 Charlton avenue. General contractor, W. J. Drake, 218 Macauley St. E. 2½-sty., brick construction.

Alterations to apartments to cost $6,000, Main and Sherman avenue. Owners and general contractors, Geo. Clapham & Son, 69 Hughson street S.

Apartment house to cost $10,000. Owner and general contractor, Alex. Milne, 67 Mary street. 3-sty. and basement, tar and gravel roofing, hardwood floors, combination fixtures.

Montreal, Que.

Residence, cost $5,000, Beaubien street. Architect and builder, J. J. Beauregard, 443 Beaubien street. Three storeys, 25 x 60, pressed brick construction, cement foundation, felt and gravel roofing. Foundations in.

Residence, cost $3,000, Delorimer St. Architect and builder, P. Berthiaume, 346a Marguette street. Three storeys, 25 x 42, brick construction, cement fndn., felt and gravel roofing. Foundations in.

Residence to cost $4,000. Architect and builder, Azarias Marcotte, 767 Mance street. 3-sty., 25 x 40, brick construction. Foundations in.

Residence to cost $3,500, Marcil Ave., for M. Levitt, 989 Main Street Annex. Architect and builder, R. Manson, 381 Victoria street. 2-sty., 25 x 45, brick veneer construction, cement foundation. Foundations in.

Apartments (alterations) to cost $10,000, for Norman W. Lester, 589 Dorchester street west. Architects, MacVicar & Heriot, 104 Union avenue. General contractors, A. M. Ross & Co., 1360 St. Urbain street, 3-sty., 19 x 26, stone foundation and brick construction.

Ottawa, Ont.

Residence, cost $5,000. Owner and builder, Wesley Davidson, 209 Sunnyside. 34 x 36, double brick veneer construction, stone foundation.

St. Catharines, Ont.

Residence to cost $3,000 for Catharine Flynn, 177 Lake street. Architect and general contractor, John Gilchrist, c/o owner. 2-sty., 30 x 40, brick veneer construction, stone foundation.

Toronto, Ont.

Residence, cost $15,000, Foxbar Road, for W. J. Slanker, 309 Avenue Road. Architects, Langley & Howland, Continental Life Bldg. Masonry, Bayless & Son, 265 Gladstone ave. 2½ storeys, tile and brick construction. Foundations in.

Residence to cost $3,000, W.S. Spadina road. Architects and builders, Wheller & Co., 7 Sinclair avenue. 2-sty. and attic, brick foundation, brick construction.

3 detached residences to cost $8,000, Jones avenue. Owner and builder, A. A. Hawthorne, 639 Carlaw avenue. 2-sty., brick construction, brick foundation.

Apartment house to cost $15,000, St. Clair and Avoca avenue, for Mrs. M. Cohen, 57 Heath street E. Architects, Langley & Howland, 157 Bay street. Mason, Samuel Young, Jr., 69 Hazelton avenue. Carpenter, Fred. Markham, Orchard View Blvd. Plastering, R. C. Dancy, 171 Spadina road. 2½-sty., brick foundation and construction.

Power Plants, Electricity and Telephones

Dauphin, Man.

Power house planned by Town Council. Clerk, John A. Garby, Box 33. Engineers, Chipman & Power, Mail Bldg., Toronto, Ont. Tenders will be called and contracts awarded shortly.

Humboldt, Sask.

Power house equipment. Engineers, Chipman & Power, Mail Bldg., Toronto, Ont. Contracts for engines and boilers let to E. Leonard & Sons for $8,750. Contract for electric equipment let to Can. Gen. Elec. Co., Toronto, for $11,725.

New Westminster, B.C.

Gas plant contemplated by city council; Clerk, W. J. Duncan; capacity 200,000 ft. per day. Holder 150,000 ft. capacity. 21 miles of gas mains will be required. Work will start in spring.

Winnipeg, Man.

Ornamental street lighting standards, Ellice avenue, planned by Board of Control. Sec., M. Peterson. Engineer, J. G. Glassco, 54 King street.

THE DOMINION WOOD PIPE COMPANY
LIMITED
NEW WESTMINSTER, B.C.
MANUFACTURERS OF
DOUBLE WIRE WOUND

AND
CAST IRON SPECIALS, VALVES, HYDRANTS, ETC.

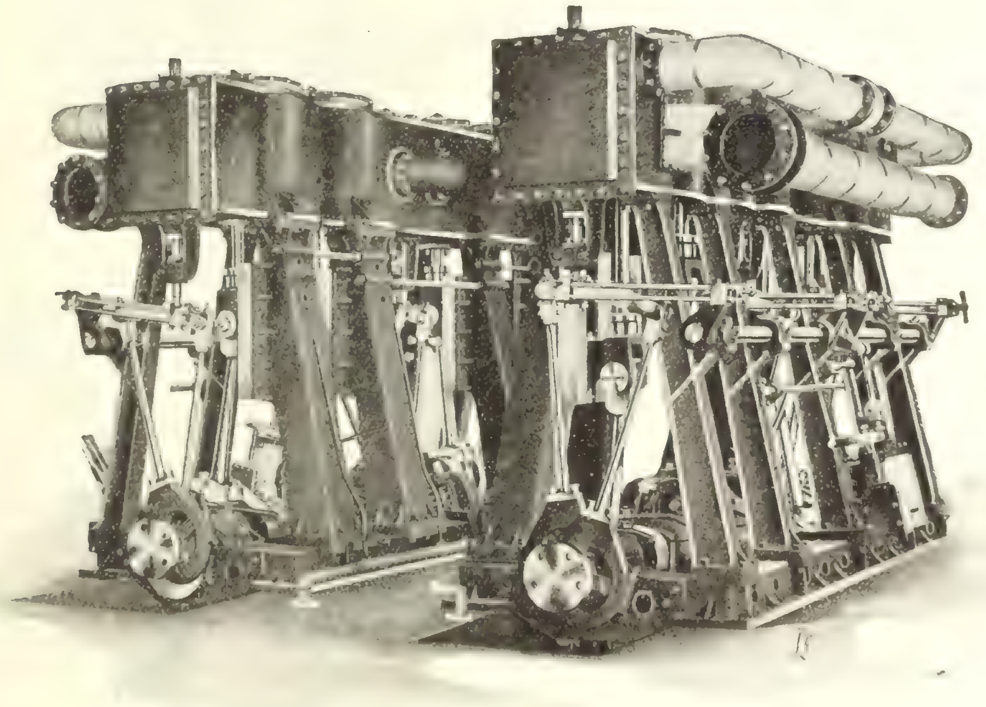
Tenders

A few dollars spent in advertising your proposals in

The Contract Record

would result in additional competition, which might save your city or town or your client many hundreds of dollars.

ENGINES and BOILERS



Marine Engine built for the R. & O. Nav. Co.'s Steamer "Rapids Prince."

We make Boilers of every kind for any service. Engines, Pumping Machinery and heavy Plate work. "Inglis" indicates the best in Quality, Design and Workmanship.

Write us for particulars

The John Inglis Co., Limited

ENGINEERS AND BOILERMAKERS

14 Strachan Avenue Toronto, Canada

LUNDY SHOVELS

For Railroad and Municipal Contractors

Are known from coast to coast for their strong construction and durability, and are in use on the largest construction works in the country.

Only the very best materials enter into their manufacture and our trade mark stamped on every shovel is a positive guarantee that goods are as represented.

Our Round Point Socket Strap Plain Black Shovel

The Shovel That Stands The Test

We will send to any contractor, free, express prepaid, upon request, a sample shovel, which will speak for itself. Send also for our illustrated catalogue, showing our full line of Shovel Spades, Scoops, Draining Tools, etc.

Carried in stock by all leading wholesalers, or direct from the manufacturers

Trade Mark

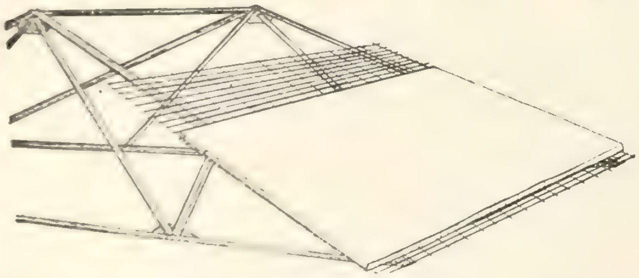
The LUNDY SHOVEL AND TOOL CO., Ltd.

General Office and Works : PETERBORO, ONTARIO

ONTARIO AGENT
N. B. Misener, Toronto

SELLING AGENTS
Delorme Bros., Montreal ; Tees & Persee, Ltd., Winnipeg
Tees & Persee of Alberta, Ltd., Calgary ; E. E. Crandall, Vancouver, B.C.

Concrete Reinforcement



Our Bonding is a Crimped STEEL WIRE Fabric

Can be made in any Length or Width to suit you.

We claim in the erection of roofs and floors our continuous reinforcement has no superior, inasmuch as it knits the entire mass into an actual monolithic slab, weak at no point and so tied together that in case of accident from any cause whatever, no single section would fall but would be sustained by carrying capacity of wires running in continuous lengths over top of roof trusses or purlins

Inquiries Solicited

When in Need of——

Ornamental

Wire and Iron Work

SEND US YOUR ENQUIRIES

We specialize in

Jail and Prison Work

Canada Wire & Iron Goods Co., Hamilton

Centrifugal Pumps

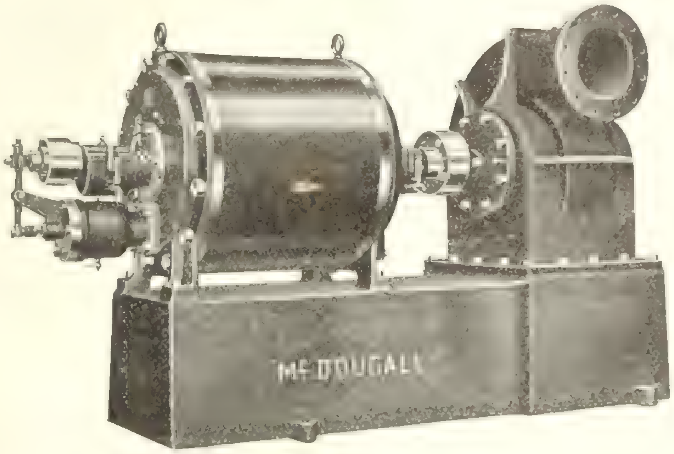
DRIVEN BY

KERR STEAM TURBINES

FOR

WATER HEATING SYSTEMS

SEE BULLETIN 106



75 h.p. Turbine and 10" Pump Capacity 2150 gals. per min.

THE JOHN McDOUGALL CALEDONIAN IRON WORKS CO., LIMITED

Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery Pumps, centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants

Works: Seigneurs & William Sts., MONTREAL Sales Offices: MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

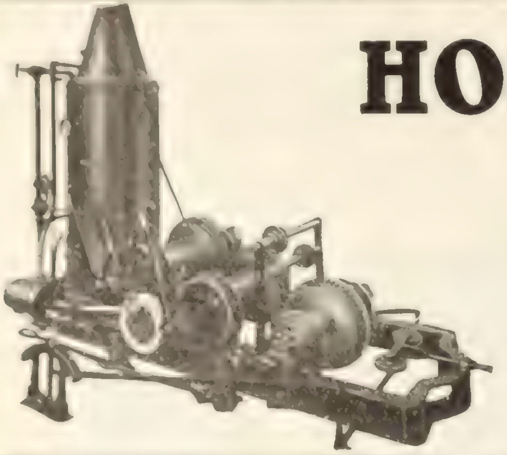
Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath.

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, *General Sales Agent*
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers



HOISTING ENGINES

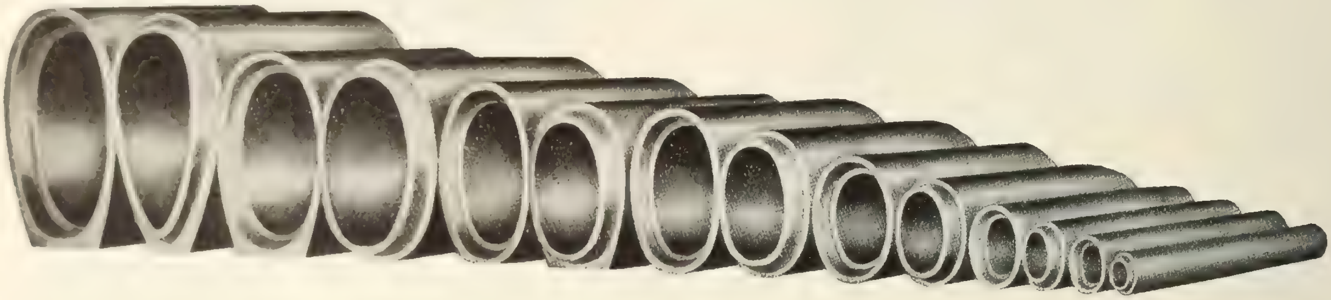
Some of the strongest friends of the M. & H. Hoists are to be found among the men who have owned and used them. For instance the following written by one of the Lumber Kings of Canada—a man who telegraphed us an unsolicited order for another hoist not long ago.

"Answering your enquiry, I am pleased to state that the hoists with which you supplied me some years ago have given good satisfaction and have been in pretty constant use ever since.

No other Hoist in Canada has so many practical improvements as the M. & H. Hoist for 1912. Let us tell you about them.

Marsh & Henthorn, Limited

Sales Agents: MUSSENS Limited, Montreal **Belleville, Ontario**



Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario

EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative: E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

Wrought
Iron
Door
Grills

Kick Plates
Push Plates

We make all sorts of work in wrought iron, brass and bronze, for the protection and decoration of the exterior and interior of buildings.

CATALOGUE ON REQUEST

Dennis Wire & Iron Works Co.
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET

"HALITUS"
Ventilators

Highly
Efficient

Inexpensive

Sizes
6 to 96 inch
Diameter
Neck Meas't.

The Flanged **"Halitus"** just as shipped, all ready to nail on the roof.

Catalogue and price list on request.

The Metallic Roofing Co.
LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.
(C 42)

Wooden Water Pipe

Galvanized Wire Wound and Continuous Stave Pipe for Water Works, Power, Irrigation, etc.
Withstands 250 lb. working pressure.

Not affected by Frost, Corrosion, Electricity or Acid. Water Works Systems installed. Prompt attention to inquiries.

Write for prices.

Manufactured by
Canadian Pipe Co., Limited
P.O. BOX 915 Factory: 550 Pacific St., VANCOUVER, B.C.

Argenteuil Granite Co., Limited

42 Craig Street West, MONTREAL

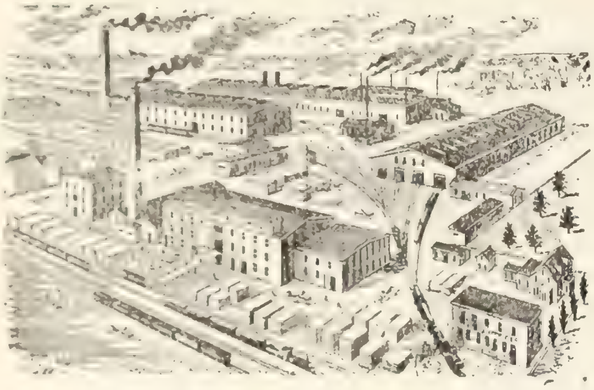
We are in the market to bid on your plans for granite on buildings.

Our up-to-date cutting plant, excellent quarries and good shipping facilities enable us to make close prices.

SEND US BUILDING PLANS TO - DAY

Rhodes, Curry Co., Limited

Lessees



Bank and Office Fittings

SCHOOL DESKS A SPECIALTY

We manufacture all kinds of building materials, including cast iron columns, cresting, sash weights, etc.

In addition to our large stock of native lumber, we are now carrying about one million feet of foreign lumber, including oak, walnut, ebony, whitewood, basswood, red cedar, Douglas fir, mahogany, &c.

Rhodes, Curry Co., Ltd. **Amherst, N. S.**

BRANCHES AT

Halifax **Sydney**

"EBANO" and "EAGLE" Brands

MEXICAN ASPHALT

HERKIMER ST., HAMILTON. Paved with our Mexican Asphalt.

Write for analysis and samples

The

Asphalt & Supply Company, Limited

Sole Canadian Agents for the Mexican Eagle Oil Co.
Also Agents for MASTIC ASPHALT for Sidewalks.

428 Transportation Bldg., MONTREAL

[illegible] F. E. Cooper J. V. Cuttriss

Hamilton Art Glass Co.

143½ King St. East, Hamilton, Ont.

Telephone 3537

Glass of all Kinds and Patterns for Dwellings, Stores, Offices, Public Buildings and Churches.

Church and Domestic Art Glass

In Lead, Electroglazed and Copper Bar

Ornamental Chipped and Sand Cut Glass. Bevelled Plate and Mirrors. Plate and Window Glass

---

There's a Reason Why

ELATERITE Paints and Waterproofings

Are Superior to ALL Others.

Cut shows application of plaster coat over "Elaterite." It both BONDS & WATERPROOFS. Catalogue "CR" gives details.

It's the natural characteristics of the rubbery pigment—intensely adhesive quality; resistance to all acids and heat; permanent elasticity and pliability; absolute waterproof character.

There's an "Elaterite" for every kind of surface.

Write for "History of Elaterite" to

FRANK CAMPBELL, Mgr.

815 Bathurst Street, TORONTO

$Dolarway Pavement

"It is permanent because it is concrete"

Solves the Concrete Pavement Problem

UNTIL the advent of Dolarway, the success of concrete pavements was questioned. They were perfect in theory but did not work out in practice.

A few years ago the first Dolarway Pavements were laid in Ann Arbor, Michigan and the problem of satisfactory concrete pavements was solved. The solution was as simple as it is satisfactory.

Over the concrete was spread a thin layer of dolarway bitumen. This made the ideal plastic surface, without which concrete pavements had not been entirely satisfactory. The surface is not only inexpensive but its renewal costs very much less than the maintenance costs of any other form of pavement.

This thin sheet of Dolarway bitumen has proven ample to protect the concrete from fracture by traffic or damage by water or frosts. In fact, as long as the bitumen is maintained the concrete shows no wear or deterioration.

The Dolarway method reduces the cost on permanent pavements 50 cents to $1.00 per square yard.

The pavement presents a handsome surface; it is quiet under traffic; no dust or mud is produced; no damage by oil drippings or thrusts of automobile wheels. It makes a most satisfactory cushion for horses.

Dolarway is the ideal material to pave between and adjoining street car tracks. Dolarway is good enough for city streets and cheap enough for country roads.

Further details on request

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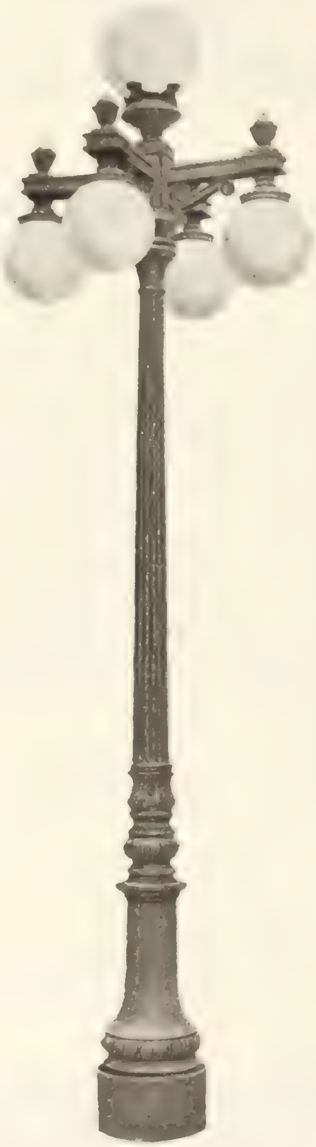

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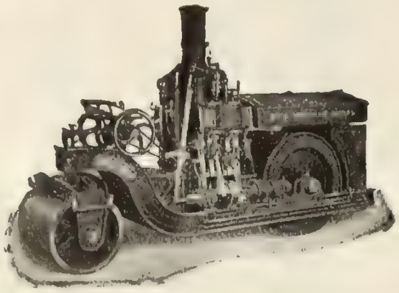

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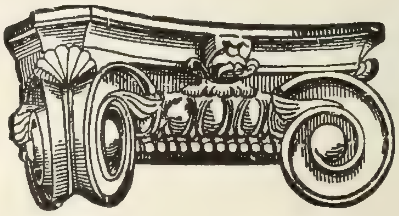

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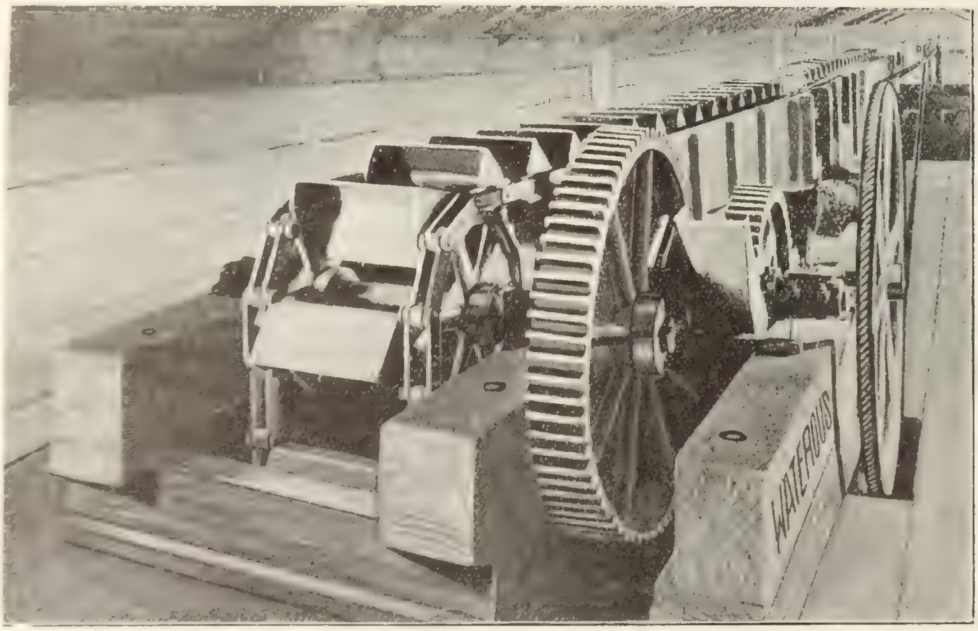

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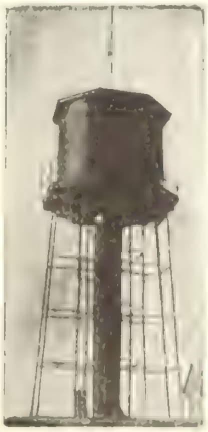

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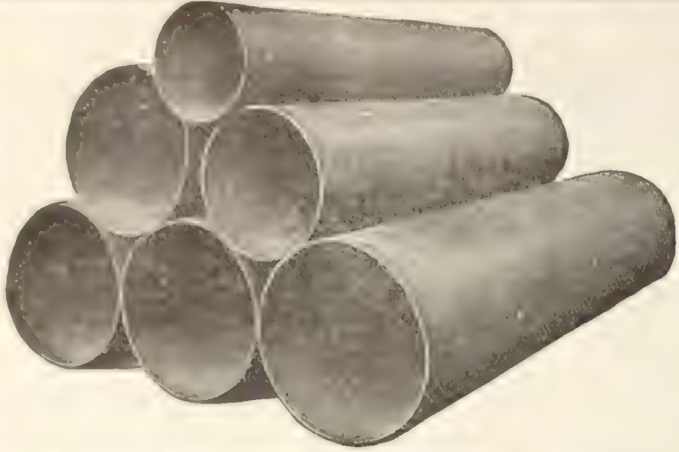

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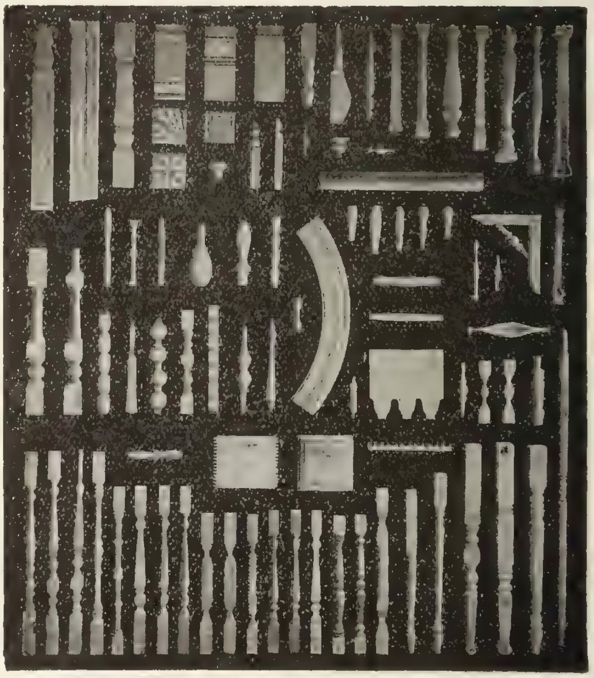

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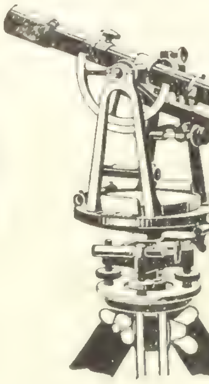

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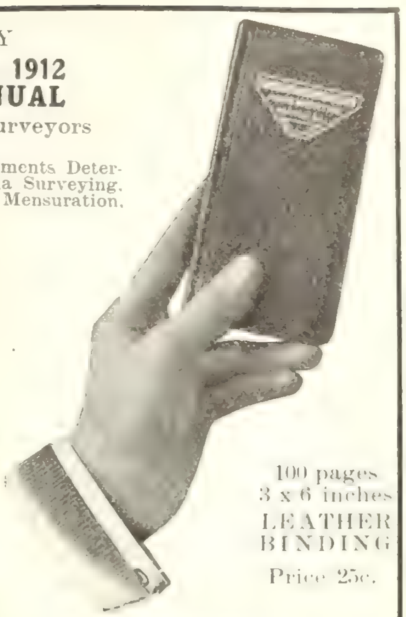

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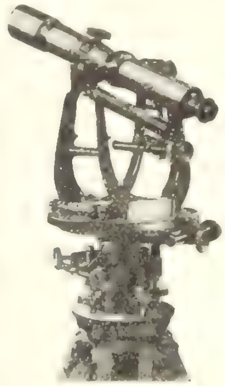

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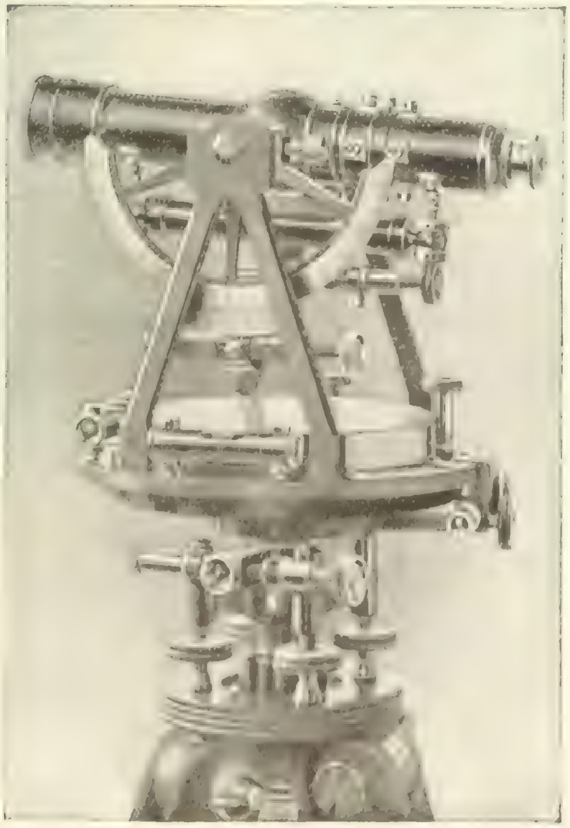

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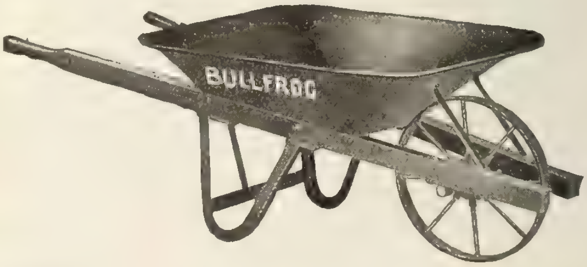

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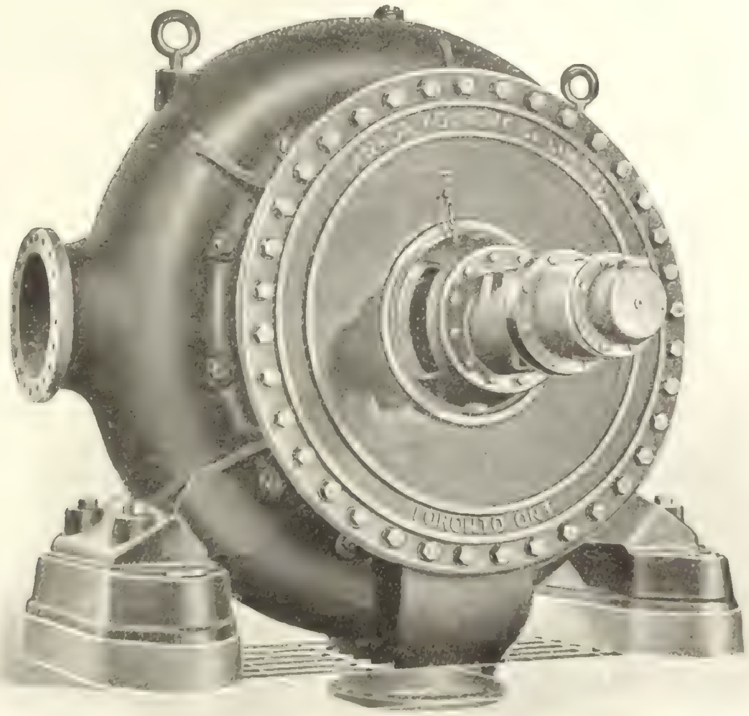

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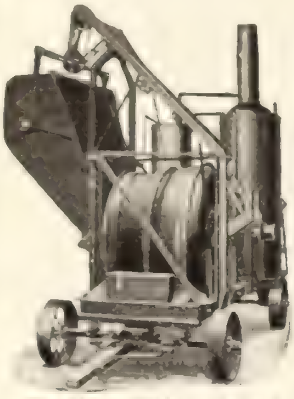

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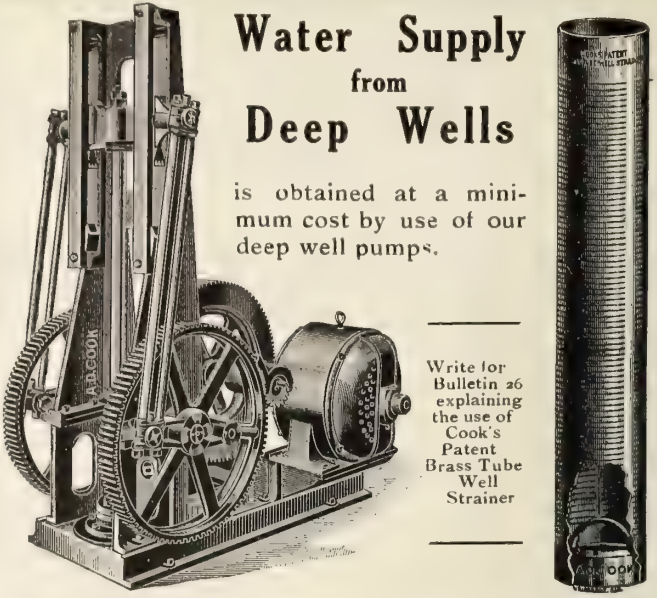

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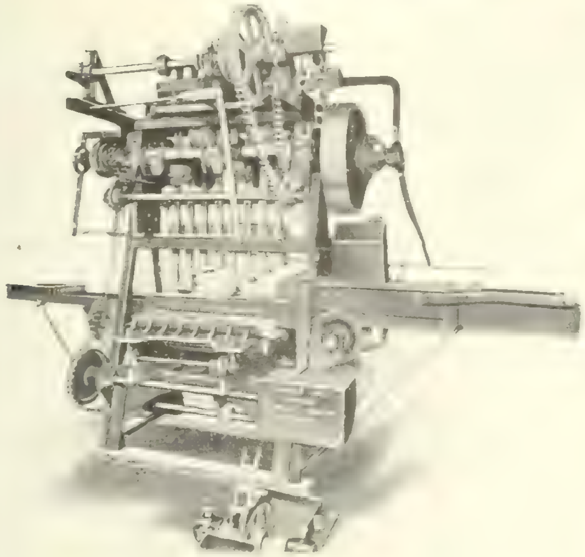

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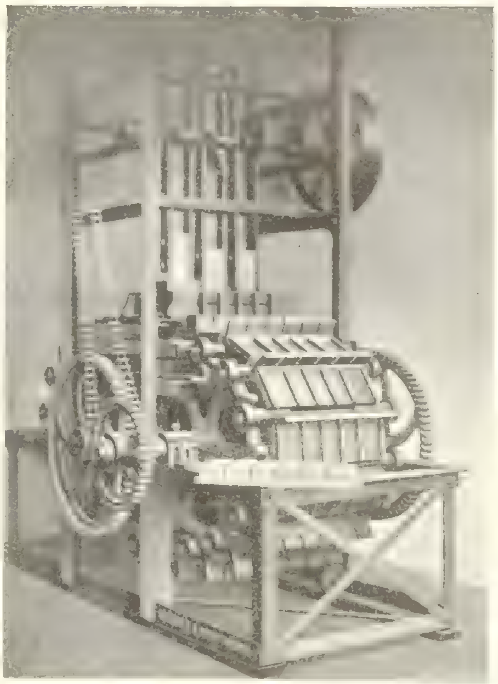

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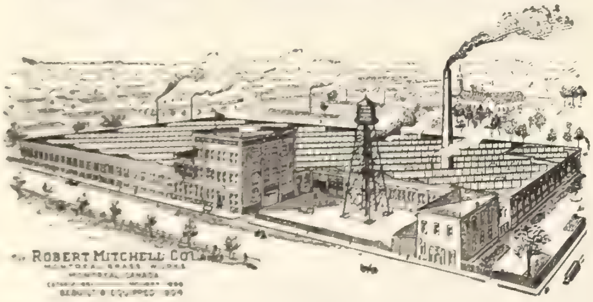

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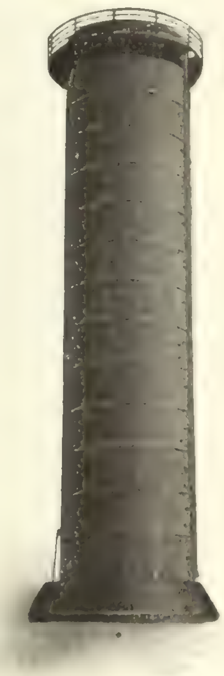

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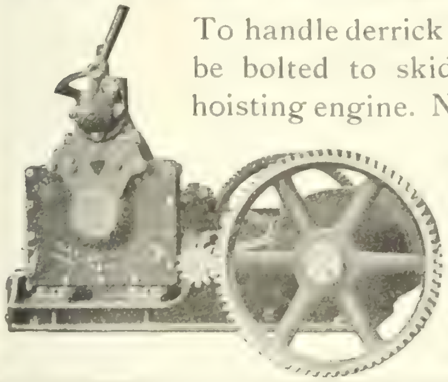

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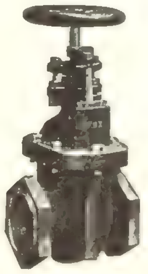

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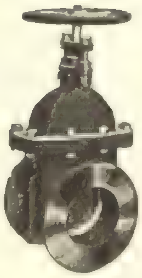

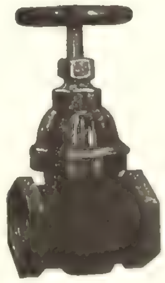

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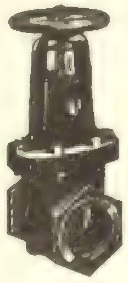
We make valves and hydrants for every branch of municipal waterworks, and for heating systems.



What are the requirements of your city or town?

Always specify KERR.

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Alsen's Cement

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Stand Pipes and Water Towers for Corporations a Specialty

Expert Builders of

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Storage and Pressure Tanks of various capacities carried in stock.

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for Engineers and Contractors

We are manufacturers of a very complete line of tents for engineers' and contractors' use and can make shipment the same day as order is received.

We also make engineers' and surveyors' clothing, in fact we can fit you completely for camp and survey trips.

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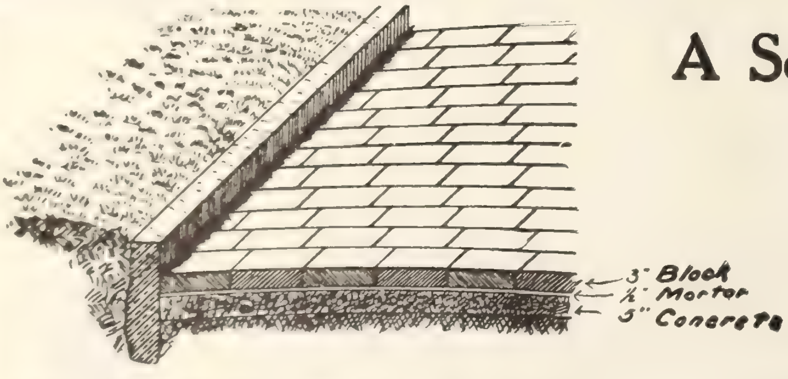

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Durable and Non-Abrasive.
Non-Absorbent and nearly Noiseless.
Unaffected by extremes of Temperature.
Sightly and Sanitary.
Easily Repaired and Easily Cleaned.

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Asphalt Block Pavements
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Dudley S. Van Antwerp, Architect, Montclair, N. J.

Cabot's Waterproof Cement Stains

Artistic Coloring and Thorough Waterproofing in One Operation

They give the same soft, artistic coloring effects as the celebrated Cabot's Shingle stains and at the same time make all exterior cement surfaces ***completely*** and ***permanently*** rainproof. They sink into the pores and form no coating over the surface, and therefore do not cover and spoil the natural texture of the cement and cannot crack or peel off. Low cost, easy to apply, and the only artistic colorings for cement.

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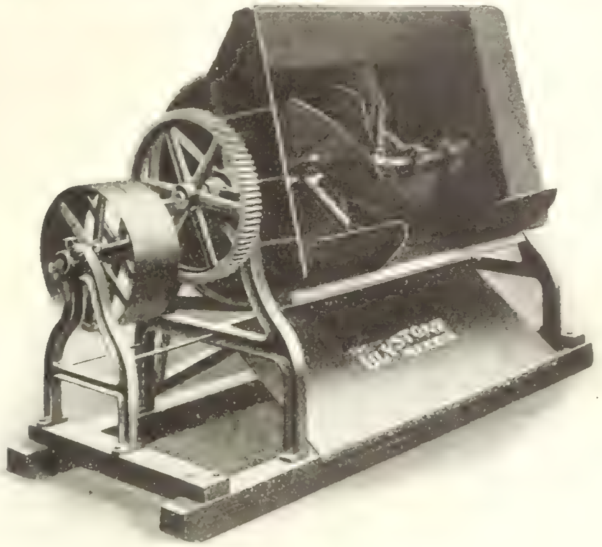

The Blystone Skid Mixer

The perfect design and construction of this mixer reduces the working cost to a minimum and effects the greatest ease in operation. All working parts are strongly made and will not get out of order.

Easy to work Easy to Clean High efficiency Low cost

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Fire-Proof, Rust-Proof, Indestructible Sheathing

The most satisfactory sheathing ever produced for Warehouses, Mills, Freight Sheds, Elevators, Rinks and similar buildings is

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Corrugated Sheathing

It is made of best Portland Cement, reinforced with interlacing Asbestos Fibres. Each sheet is formed separately between heavy corrugated steel plates, under enormous pressure which compacts the material and makes it extremely hard, tough and waterproof.

Asbestos Corrugated Sheathing cannot rust, never requires paint, and will outlast any other sheathing ever produced.

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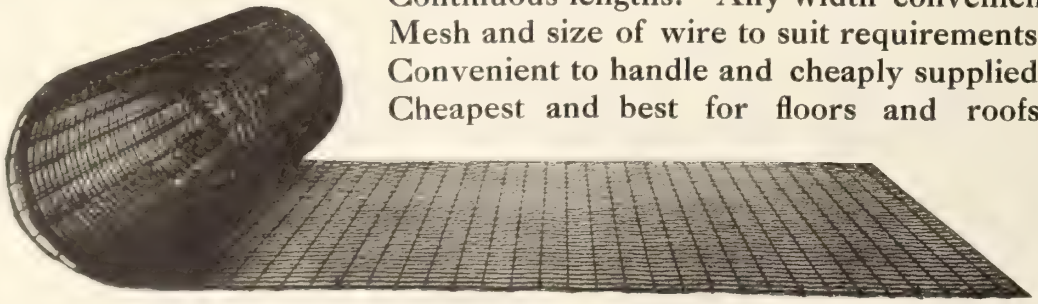
Steel Wire Reinforcing

Continuous lengths. Any width convenient to handle.
Mesh and size of wire to suit requirements.
Convenient to handle and cheaply supplied.
Cheapest and best for floors and roofs.



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Wire Rope **Wire Lath**

MANUFACTURED BY

The B. Greening Wire Co. Limited

HAMILTON, Ont. - MONTREAL, Que.

Current Prices of Building Material.

BRICKS

The following are wholesale prices delivered at [illegible]

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock Lumber—

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 [illegible]	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
[illegible] Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

Shingles—

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

[illegible]

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	[illegible]	[illegible]
Up to 25 in.	$3 50	$5 00
26-40	3 75	5 50
41-50	4 25	6 25
51-60	4 75	7 00
61-70		8 00
71-80		9 00
81-85		10 00
86-90		11 00
91-95		12 00
96-100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

McMYLER DERRICKS FOR SALE

Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turn over buckets, two (2) marine engines, boilers, fuel lighter with donkey aboard. Address

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Send for Our 1912 Catalog.

We manufacture and carry in stock the largest and most satisfactory line of cement sidewalk tools in Canada.

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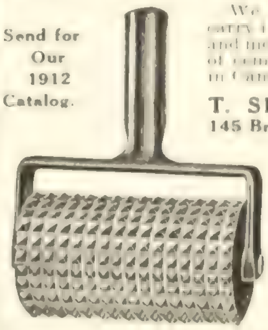

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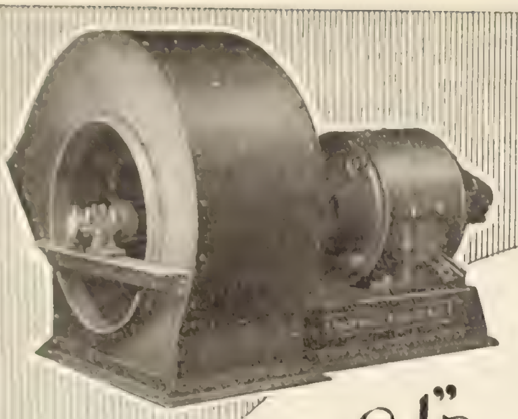

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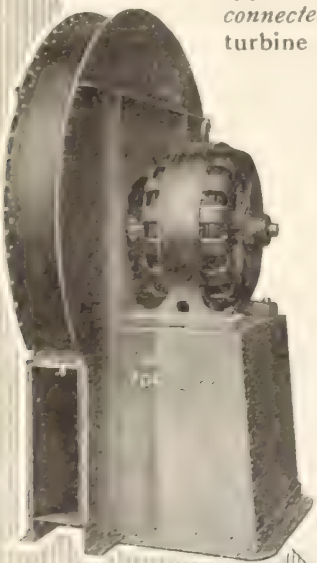

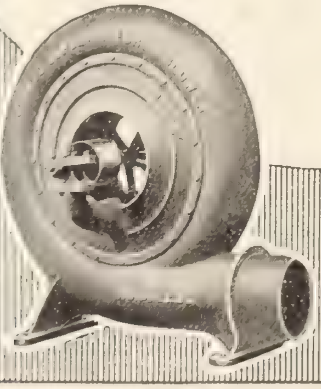

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We can provide specifications in this field based upon the use of our standard materials which will give you results based upon efficiency and REAL ECONOMY.

Dehydratine No. 1—A damp-proofing agent applied to inner walls -a furring substitute.

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Dehydratine No. 3.—For backing up cut stone—prevents staining of same.

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Dehydratine No. 6—A plastic material to be trowled on rough foundation surfaces against pressure.

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Vertical motor.
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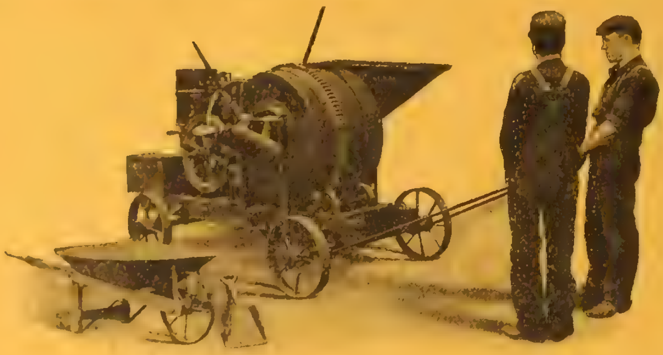

No. 4 Ransome Concrete Mixer.

is the equal of our larger machines in efficiency and is sold at a price which makes it an easy and a wise purchase for anybody.

It has a batch capacity of 4 cubic yards per hour, which is ample for any small concrete job. No. 4 Mixers are sold in one way only: i. e.—mounted on Trucks, with gasoline engine, direct drive. This is a powerful engine for its rated H. P. and the best designed—a most perfect operating engine.

The No. 4 Ransome is a great time saver in every respect. As we equip these machines with a special batch charging hopper, which is being filled while the batch in the drum is mixing—no time is lost in charging drum. By the simple lever arrangement, the whole unmixed batch is fed into the drum in an instant and the loading gang keeps right on with their work without any waits whatever. The batch is instantly discharged by merely reversing the discharge chute.

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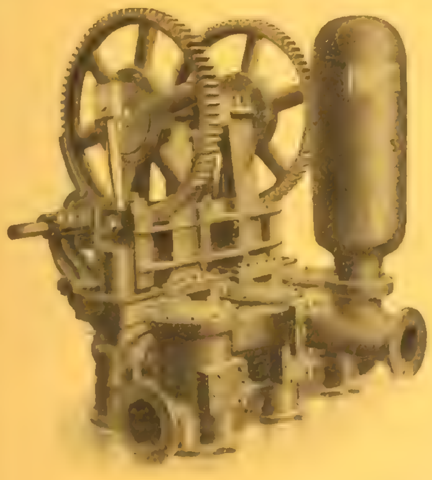
Contract Record and Engineering Review



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"ELECTRIC AIR" ROCK DRILLS
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Canadian Ingersoll-Rand Co.
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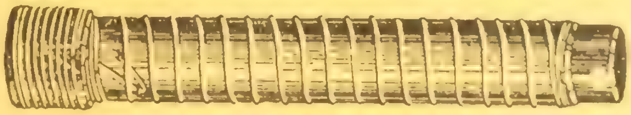

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for city and town Water Systems, Fire Protection, Power Plants, Hydraulic Mining, Irrigation, etc. One-half the cost of Iron Pipe—and better.

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Full Particulars and Estimates Furnished

Alphabetical Index of Advertisers, Page 16

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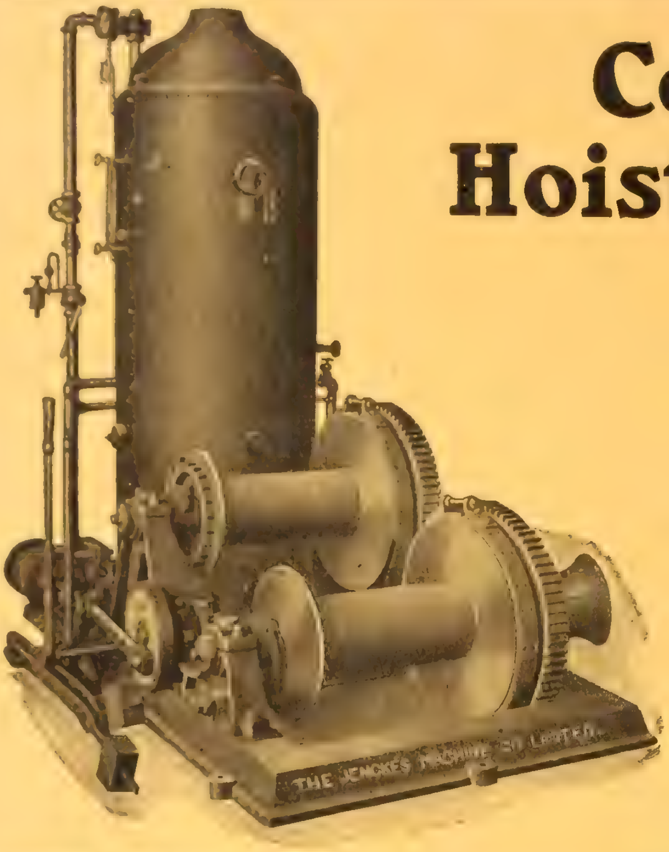

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¶ Especially designed to fully meet the peculiar requirements of Contractors' work.

¶ Great care has been taken to secure maximum strength and rigidity without unnecessary weight.

¶ Built in all the popular sizes.

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"AMERICAN" Wire Rope Blocks

will prove their makings and materials every time.

They will safeguard the lives of your men, your expensive material and your equipment.

They cost no more than the cheap kind but they're worth more.

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Delay in completion is certain to cause complaints and confusion—and is likely to cause financial loss.

Therefore, in selecting materials, it is to your advantage to specify the Cement made by the Company best equipped to supply your requirements quickly, for thus you reduce the danger of delayed delivery. The Canada Cement Company's mills—located at Exshaw, Calgary, Winnipeg, Port Colborne, Shallow Lake, Belleville, Marlbank, Lakefield, Hull and Montreal—are so placed as to provide the quickest possible delivery to any point in Canada.

WE HAVE CANADA-WIDE DISTRIBUTION

Quick delivery is an important point. Complete delivery of your whole order is even more important. Canada Cement mills have sufficient capacity to completely fill all orders promptly.

Write for "Factories and Warehouses of Concrete."
It will interest you. Enclose 12 cents in stamps for postage.

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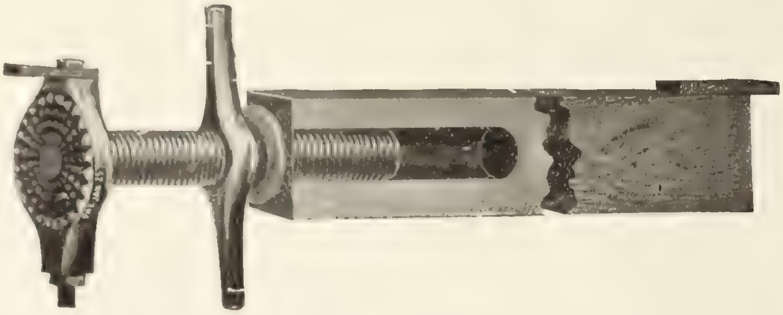
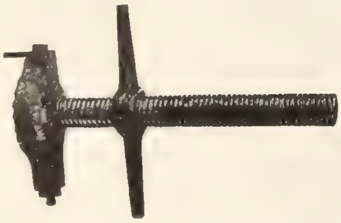
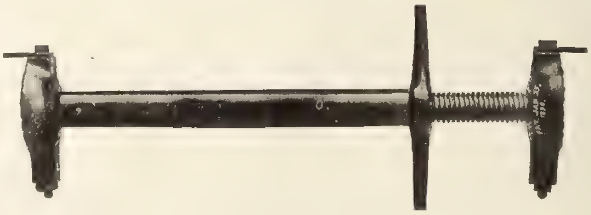


Used on Any Width of Trench

instead of the old Wooden Bracings. They are Safer and more quickly applied and more economical. Particularly useful on heavy sewer construction.



The Lug prevents their falling into the Trench and also enables one man to handle any safety brace.



Felton Sewer Rod Couplings and Rods carried in stock.

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Cobalt, opp. Right of Way Mine.

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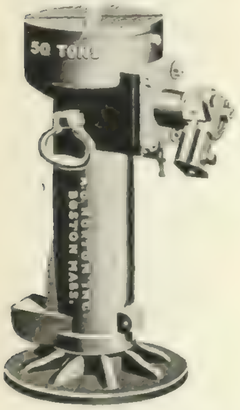

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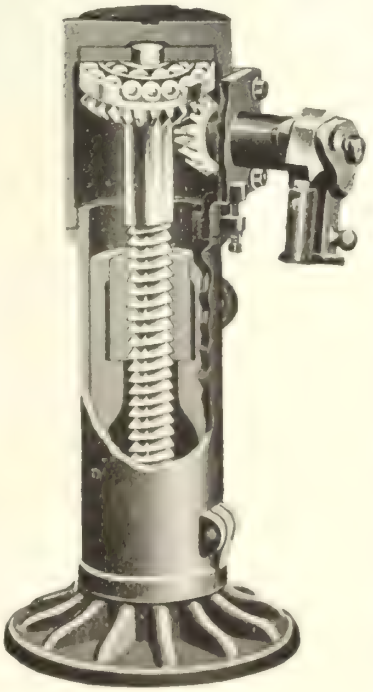
Made in Two Styles
Standard and High Speed

Ball-Bearing, Cone-Bearing, Ratchet Jacks, Best Material, Best Workmanship, Light, Strong, Absolutely Safe.



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(Continued on page 12)

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are used in the construction of the most important public buildings erected by the Provincial Government. They are specified by the leading architects for every building of importance. The latest example of the public recognition of their superiority is found in their use for the new Toronto Residence of the Lieutenant Governor of Ontario. Don Valley Bricks possess a beauty of color and an even texture and form which add that touch of distinction to a building that characterises it as fulfilling the essentials of decorative dignity.

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FENESTRA STEEL SASH not only increases production, but also reduces costs. Window upkeep expenses and artificial lighting bills are reduced almost to the vanishing point.

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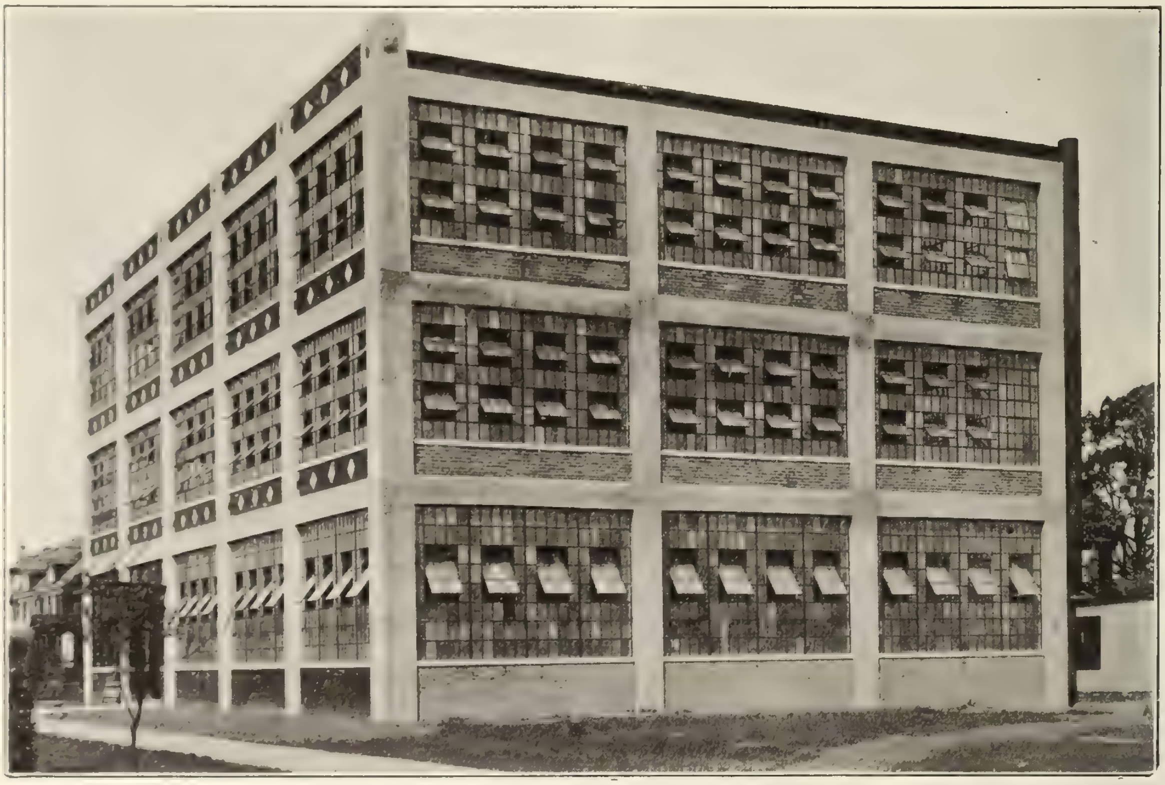

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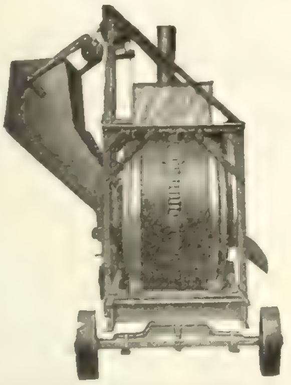
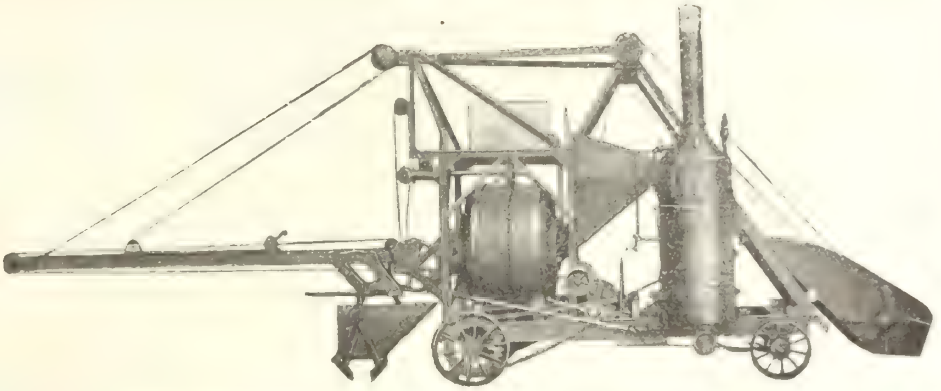
TORONTO, CANADA


London Standard Drum Batch Mixer


London Street Paving Mixer with Front Board and Delivery Boom

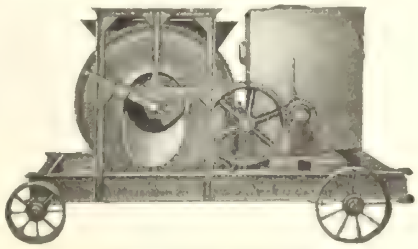
Before you Buy Machinery or Equipment of any kind

write to us for our 1912 CATALOGUE. It will save you TIME and MONEY. Do you know that we are the ONLY LARGE MANUFACTURERS who specialize on

Concrete Machinery and Contractors' Equipment

The following are a few of our lines

LONDON STANDARD DRUM BATCH MIXER in Five sizes any kind of Power or Equipment.
DRUM PAVING MIXER with Forward Loader and Rear Discharge.
DRUM PAVING MIXER with Side Loader and Rear Discharge.
AUTOMATIC BATCH MIXER Two sizes any kind of Power.
MORTAR MIXERS.
HAND POWER CONCRETE MIXERS.
TILE MOULDS.
CEMENT BLOCK MACHINES.
CEMENT BRICK MACHINES.
CEMENT TILE MACHINES.

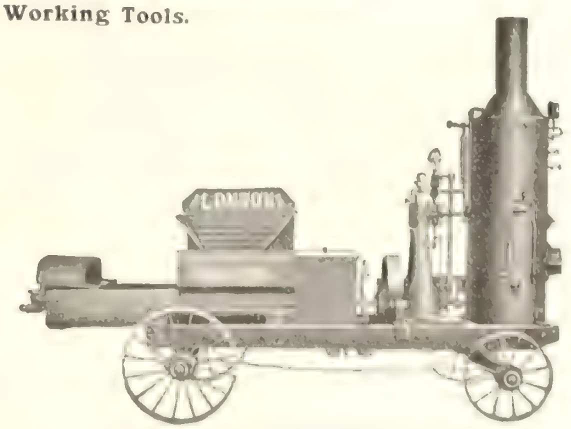

London Standard Drum Batch Mixer

SIDE WALK TILE MACHINES.
SILL STEP and **WINDOW CAP MOULDS.**

ORNAMENTAL MOULDS.
ROCK CRUSHER.
SCREEN and **ELEVATORS.**
MASON'S SAND.
SCREENING MACHINE.
GASOLINE ENGINES.
PUMPING OUTFIT.
GASOLINE HOISTS.
SIDEWALK FORMS.
MATERIAL ELEVATORS.
DRIERS both Portable and Stationary
FENCE POST MOULDS.
CONCRETE CARTS.
WHEELBARROWS.

And a complete line of Cement Working Tools.

London Mortar Mixer


London Automatic Batch Mixer No. 2

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, (106 Pleasant St.) G. B. Oland, Mgr

AGENCIES:

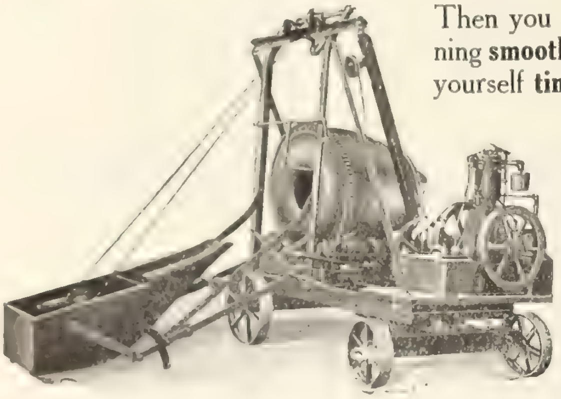
VANCOUVER, B. C. Equipment Co.,
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng. & Supply Co
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

CONTRACTORS!!

Avoid All Delay on Your Concrete Work

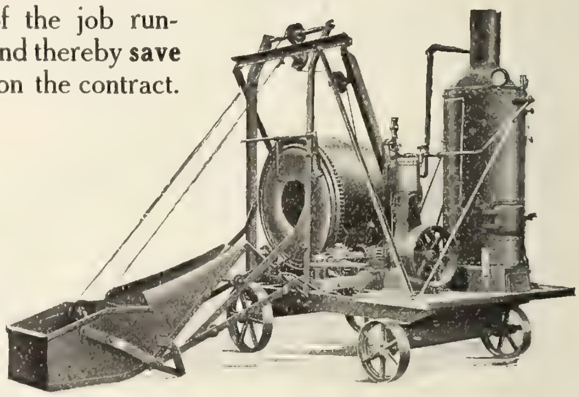
by Using

The Wettlaufer Improved Heartshape Mixer



Then you will be **sure** of the job running **smoothly** and **easily** and thereby **save** yourself **time** and **money** on the contract.

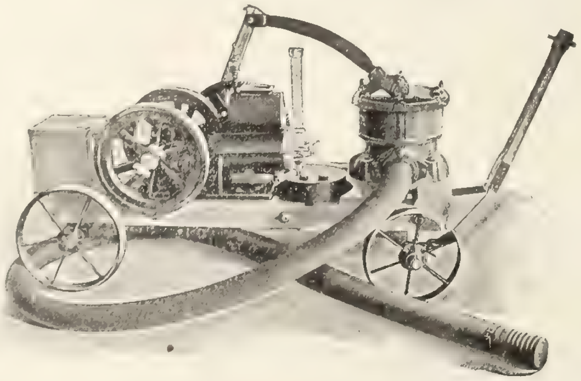
The Wettlaufer Heartshape Mixer will mix right up to capacity every minute of its operation.



Economical Working—Low Running Cost—Automatic Operation Throughout

The Wettlaufer Pump

Here is a pump that will pump out your abutments and foundations, or in any place where you are troubled with water, at an average rate of 3,000 gallons per hour.



Saves Time and Money

Does more than the work of two men at a cost of not more than 36c. a day—that is a direct saving of time, labor and money—a saving that will very soon pay the cost of the pump.

*Send for catalogue of **Mixers** and **Pumps** and come and see them working any time at*

WETTLAUFER BROTHERS

TORONTO

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Lavallee Ross, Limited
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613 Ashdown Block,
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MONTREAL OFFICE and WAREROOMS : **316 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave**

Steelcrete
TRADE MARK
CONSOLIDATED

WHY

Steelcrete
TRADE MARK
CONSOLIDATED

Steelcrete
TRADE MARK
CONSOLIDATED

Reinforcement is Superior to all Others

(12 REASONS)

Theoretical Considerations

(1) **It possesses a high elastic limit—not less than 55,000 lbs. per sq. in.** This is not attained at the sacrifice of quality or uniformity. "Steelcrete" is not a brittle and inferior steel but a tough, cold-drawn product with no equal in the market for uniformity of strength.

(2) **It provides against concentrated loads.** Its diamond-shaped structure enables it to distribute the effect of a sudden local load over a great many strands.

(3) **Attains a perfect bond in the concrete.** This is due to its mesh shape which does not permit any slipping and there is no possibility of it.

(4) **Perfect distribution of Steel.** Every foot of width possesses the theoretical amount of steel. The accuracy here attained is impossible in loose rod reinforcement.

(5) **Longitudinal reinforcement.** "Steelcrete" mesh possesses strength in the longitudinal direction of the pipe equal to one third the strength in the circumferential direction.

(6) **Temperature stresses are guarded against.** The form of the mesh provides a positive reinforcement against these uncertain but definite stresses.

Practical Considerations

(7) **"Steelcrete" mesh is essentially a fool-proof reinforcement.** With the use of this material the man with the brains that designs the construction obtains an efficiency of 100 per cent. with ordinary every-day inspection and unskilled labour.

(8) **"Steelcrete" Mesh is a stiff reinforcement.** It holds its position in the forms in a way that no other mesh equals. It is far more important to have the reinforcement placed correctly in a vertical direction than in the horizontal.

(9) **It is cheaper to install.** Requires less labour than any other mesh or system of rods.

(10) **It is easy of inspection.** Only those who know "Steelcrete" know the trouble, delay and anxiety this saves to both contractor and engineer alike.

(11) **It can be placed quickly.** This means a saving in overhead charges. This feature has been overlooked by a great many engineers and architects in the past.

(12) ALFRED ROGERS IS NOW CARRYING IN STOCK HALF MILLION SQUARE FEET OF "STEELCRETE" FOR IMMEDIATE DELIVERY.

ROGERS

Portland Cement

makes dependable concrete—carefully ground and screened—gives a quick and strong set. Any quantity, complete shipments.

ROGERS

Crushed Stone

in all sizes—clean and free from dust, dirt and mould. Guaranteed delivery — Send us your orders for crushed stone.

ROGERS

French Caen Stone Cement

Monarque Brand and Cementa-line. Rich in appearance and of unlimited durability—as good as natural stone—but cheaper. Full particulars on request.

Quotations made for all Work—Prompt Deliveries and Complete Shipments given from Stock

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28 King St. West **Toronto, Ontario.**

Western Sales Manager

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[illegible]
Linde British Refrigeration Co.

[illegible]
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Insulating Compounds
Canadian Mineral Rubber Co.
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[illegible]
Canada Office & School Fur. Co.
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Lime
Christie, Henderson & Co.
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Locomotives
Canadian Boving Co.
Montreal Locomotive Works
Canada Foundry Co.

Marble
Dominion Marble Co.
[illegible] Company
Mississquoi Marble Co.

Metal Lath
Greening Wire Co., B.
Metallic Roofing Co.
Noble, C. W.
Steel & Radiation Ltd.

Metal Forms
Hotchkiss Lock Metal Form Co.

Meters, Water
Hopkins & Co., F. H.
McDougall Caledonian Iron Wks
Neptune Meter Co.
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Canada Wire & Iron Goods Co.
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American Spiral Pipe Works
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Dominion Concrete Co.
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Bates & Edmonds
Beatty & Sons, M.
Canada Foundry Co.
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Cook, A. D.
Escher Wyss & Co.
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McDougall Caledonian Iron Wks.
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Ontario Wind Eng. & Pump Co.

Quarry Machinery
Canadian Ingersoll-Rand Co.
Improved Equipment Co.
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Gartshore, John J.
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Reinforcements, Concrete & Steel
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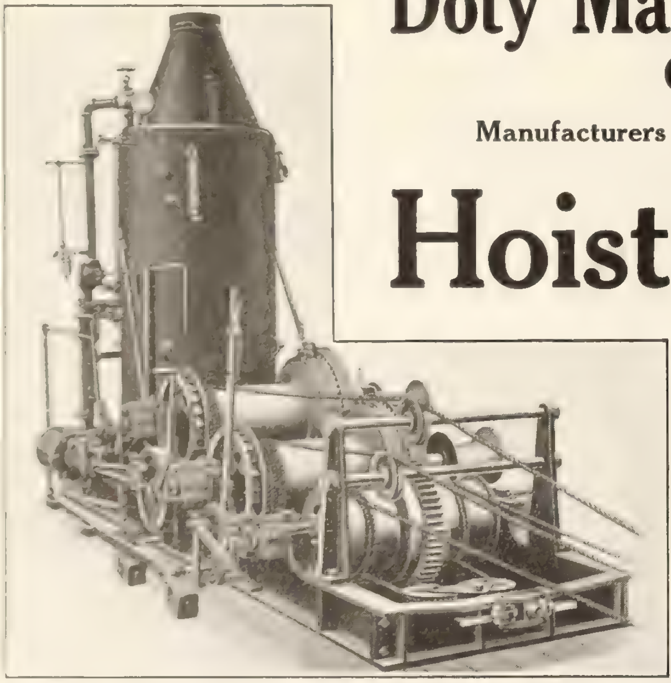
(Continued on page 14)

The
Doty Marine Engine & Boiler
Company Limited
Manufacturers of Superior
Hoisting Engines
Derrick Swingers, Material Elevators, etc.
for
Contractors, Mines and Quarrymen



This cut illustrates our Standard Double Cylinder Double Drum Hoisting Engine with Derrick Swinger attached. "Superior to any other on the market." All parts constructed, guages and templates and every engine tested under steam.

A full line of Hoisting Engines, with Boilers to pass inspection in any province, kept in stock by The Doty Engine Works Co., Winnipeg, Man., and also at our

Works—GODERICH, ONT.

To buy our Engines is a Guarantee of Satisfaction

The Real Belt Test is Actual Service

You do not care what tests a belt will stand unless it stands up under one—actual service.

The Sawyer Canvas Belt stands the hardest service in Brick and Clay Plants

This is one of the many classes of work to which Sawyer is particularly adapted. Whether you want a main drive, or smaller drive, or a large elevator belt, the Sawyer will do the work.
Write for our book "Stunts," which shows how others utilize Sawyer Canvas Belts.

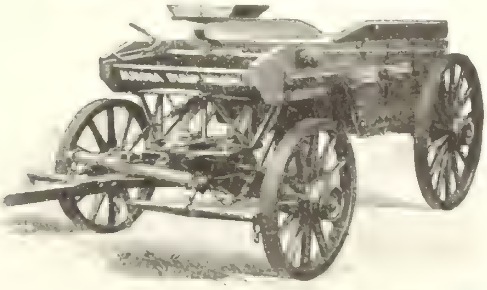
Sawyer Belting Co., Cleveland, O.

Busy Contractors Use New Model Aurora Dump Wagons

because they want wagons that will haul the most material in the least time and that are on the job every working hour.

A novel feature has been added to this wagon which places it beyond comparison with any other on the market, namely, **a steel channel filled with wood for the main side board,** giving unusual strength. This is the portion of the wagon that stands the heaviest strain, With this reinforced side board, breakage is practically impossible. It is short coupled and built low. Light in weight. **Write today.**

Western Wheeled Scraper Co.
Aurora, Illinois
Earth and Stone Handling Machinery



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS	1903	$ 0.00	1908	$ 93.26
	1904	3.30	1909	200.46
	1905	9.35	1910	14.07
	1906	37.33	1911	2.20
	1907	16.11		

Total $376.17 or $5\frac{2}{3}$c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.

Hagersville, Ont. **Limited**

CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

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[illegible] Tire & Rubber Co.

Safes and Vaults
Taylor, J. & J.

Sand and Gravel
[illegible] Sand and Material Co
Sand and Supplies Ltd.
[illegible] Sand and Gravel Co

Screens
Canada Wire & Iron Goods Co
Greening Wire Mfg. Co., B.

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Canada Iron Corporation
Dominion Sewer Pipe Co.
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Ontario Sewer Pipe Co.
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Austin Drainage Excavator Co.
Lecky & Collis
Mun. Engineering & Contracting Company

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Cabot Inc., Samuel

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Browning Engineering Co.
Beatty & Sons, M.
Canada Foundry Co., F. H.
Hopkins & Co., F. H.
Montreal Locomotive Works
Mussens Limited
Thew Automatic Shovel Co.
Willis Shaw Mach. Co.

Shovels
Lundy Shovel & Tool Co.

Smoke Stacks
Des Moines Bridge Co.
Hamilton Mfg. Co., Wm.

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Canadian Buffalo Forge Co
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Sturtevant Co. of Can. Ltd., B. F.

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Canada Steel Co., Ltd.
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Canada Steel Co., Ltd.
Factory Products
Steel Co. of Canada.
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Stone
Britnell & Co.
Brodie, Jas.
Christie, Henderson & Co.
Consolidated Stone Co.
Contractors' Supply Co.
Corinthian Stone Co.
Crushed Stone, Limited
Hagerville Contracting Co.
Mahan & Company
McMillan & Son, W.
Morrison & Co., T. A.
Myers, Oakley
Queenstown Quarry Co.
Rogers Supply Co.
Roman Stone Co.
Sackville Freestone Co.
Sand & Supplies
Smyth & Ryan

Stone Saws
Anderson, Geo.

Structural Iron and Steel
Canada Steel Co.
DesMoines Bridge Co.
Dominion Bridge Co.
Factory Products
Dominion Steel Castings Co.
Hamilton Bridge Works Co.
Mackinnon Holmes & Co.
McNeil & Co., W. P.
Phoenix Bridge & Iron Works
Provincial Steel Company
Reid & Brown
Sarnia Bridge Company
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Inglis, John
Jenckes Machine Co.
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McDougall Caledonian Iron Wks
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Tents
Turner & Sons, J. J.
Woods Limited
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Canada Iron Corporation
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Johnson, A. H.

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Can. H. M. Johns-Manville Co.
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"PIONEER"
ASPHALTS

"PIONEER" Highest Quality ASPHALTS
TRADE MARK

The 16 year record of "PIONEER" ASPHALTS is the best assurance an Engineer can have as to their efficiency, permanency and economy. Specify "PIONEER" ASPHALTS

For Asphalt Macadam Roads, Asphaltic Concrete, Sheet Asphalt Paving—and Filler for Brick and Block Pavements

and results will be highly satisfactory. "PIONEER" ASPHALTS are 99.5 per cent. pure bitumen. They are waterproof and weatherproof. Can be used for all purposes where an asphalt can be used.

Write for Specifications

THE CANADIAN MINERAL RUBBER CO., Ltd.
Canadian Express Building, MONTREAL
503 Canada Building, WINNIPEG

ISABELLA STREET, TORONTO, ONT., TREATED WITH "TARVIA B."

Toronto's Experience with "Tarvia B."

Here is a street that was treated with Tarvia B in May, 1911, at the cost of 3 cents per yard. On July 28th, a second application was made at less expense. These two applications were sufficient to keep the surface in perfect condition throughout the year. In June, 1912, it was given an extra heavy application of Tarvia B, costing 3½c. per yard, and stayed in good condition for the rest of the year. The surface has withstood practically the same cleaning as asphalt streets, being flushed with a pressure water wagon every week.

In the beginning the road was well worn macadam with an inclination toward ravelling in many cases.

Since the treatment began, it has been a well-bonded bitumen surface which retains its contour and smoothness with practically no cost for maintenance other than the Tarvia above mentioned.

Of all the bitumens proposed for road bonding purposes, Tarvia is the best because of its superior natural adhesive qualities. It forms a tough plastic matrix around the stone and prevents ravelling by traffic or torrents. Its cost is so low that in most cases it is actually cheaper to have a dustless road with Tarvia than a dusty road without it.

Booklets on request.

THE PATERSON MANUFACTURING COMPANY, LIMITED
MONTREAL TORONTO WINNIPEG VANCOUVER

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ALPHABETICAL LIST OF ADVERTISERS

[illegible]	101
[illegible] Works	
Alabastine Company	24
[illegible]	24
[illegible] Works	98
[illegible] Construction Company	
[illegible] Limited	
[illegible] & Tile Co.	84
[illegible] & [illegible] Co.	2
American Spiral Pipe Works	23
[illegible] Company	
[illegible] & Co., Limited, George	22
[illegible]crete Company	
[illegible]	96
[illegible] Company	99
[illegible] & [illegible] Limited	79
Automatic Wood Box & Turning Co.	84
Baker Co., R. D.	19
Batts Limited	100
Beatty Bros.	
[illegible] & Sons, Limited, M.	77
Bechtels Limited	
Bennett, Robert	
Blystone Machinery Company	1
[illegible] & [illegible]	96
Britnell & Company, Limited	90
Browning Engineering Company	79
[illegible]	95
Brown Hoisting Machinery Company	22
Brown Machine Company	90
Brodie & Company, James	79
Buff & Buff Manufacturing Company	
Cabot Incorporated, Samuel	
Campbell, R.	96
Canada Cement Company	3
Canada Foundry Company, Limited	87
Canada Iron Corporation Limited	95
Canada Lifting Jack Company	82
Canada Steel Company	27
Canada Wire & Cable Company	27
Canada Wire & Iron Goods Co.	89
Canadian Boving Company	28
Canadian Bridge Company	92
Canadian Buffalo Forge Company	102
Canadian Fairbanks-Morse Co., Ltd.	78
Canadian H. W. Johns-Manville Co.	25
Canadian Kellogg Company	
Canadian Mineral Rubber Company	14
Canadian Office School Furniture Co.	
Canadian Pipe Company, Limited	34
Canadian Ingersoll-Rand Company	1
Canadian Supply Company	
Ceresit Waterproofing Company	25
Chain Belt Company	
Chipman & Power	96
Christie Henderson & Company	84
Clapham & Sons, John	
Cleveland & Erie Machinery Company	101
Commercial, The	
Conduits Company Limited	95
Consolidated Stone Company	
Consolidated Plate Glass Company	
Contractors' Supply Co., Ltd.	90
[illegible]	
Corinthian Stone Company	
[illegible]	
Crushed Stone Limited	83
Dahlstrom Metallic Door Company	
[illegible]	95
Dennis Wire & Iron Works Company	75
DesMoines Bridge & Iron Company	93
Dickson Bridge Works	
[illegible]	96
Dominion Bridge Company	22
Dominion Concrete Company	74
[illegible]	76
Dominion Ornamental Iron Company	
Dominion Marble Company	21
Dominion Sewer Pipe Company	20
Dominion Steel Castings Company	26
Dominion Wood Pipe Company	89
Don Valley Brick Works	7
Doty Marine Engine & Boiler Co.	12
Douglas-Milligan Company	36
Elaterite Paint Company	88
Engineering Works of Canada	79
Erie Machine Shops	101
Escher Wyss	91
Estimators & Quantity Experts	101
Factory Products Limited	35
Farmer, John T.	96
Ferguson, H. S.	96
Foundation Company	97
Fraser, E. M.	96
Fuce & Smith	96
Galt Engineering Company, John	96
Galt Stove & Furnace Company	74
Garlock Packing Company	81
Gartshore John J.	96
Gartshore-Thompson Pipe & Foundry Co.	94
Gaudry & Company, L. H.	78
General Supply Company	28
Goodyear Tire & Rubber Co. of Canada, Ltd.	33
Greening Wire Company, Limited, B.	112
Gurley, W. & L.	85
Hagersville Contracting Company	13
Hancock, Jr., H. Syd.	96
Hamilton Art Glass Co., Ltd.	88
Hamilton Bridge Co.	38
Hamilton Mfg. Company, Wm.	21
Hamilton Pressed Brick Company	35
Harvey, J.	101
Heinicke Company, H. R.	20
Hepburn, John T.	32
Hobbs Manufacturing Company	103
Hopkins & Company, F. H.	104
Hotchkiss Lock Metal Form Company	83
Hunter Bridge & Boiler Company	93
Hunt & Company, Robert W.	96
Hynes, W. J.	20
Improvement Equipment Company	21
Imperial Wire & Cable Company	103
Inglis Company, John	71
International Marine Signal Co.	18-84
Jamieson Lime Company	103
Jenckes Machine Company	2
Johnson, A. H.	98
Kennedy, James C.	96
Kerr Engine Company, Limited	109
Laurentian Granite Company	101
Laurie & Lamb	80
Lautz Company	
Lea, R. S.	96
Lecky & Collis	17
Leonard & Sons, E.	83
Linde British Refrigeration Company	
London Concrete Machinery Company	9
Lundy Shovel & Tool Company	84
Luxfer Prism Company	91
MacLean Daily Reports	88
Mahan & Company	82
Marsh & Henthorn, Limited	74
McCoy Company, Henry J.	22
McDougall Caledonian Iron Works Co., John	73
McDowal, R.	96
McKinnon Holmes & Company	80
McMillan & Sons, W.	82
McNeil & Company, William P.	94
Meadows George B.	35
Metallic Roofing Company	75
Metropolitan Paving Brick Co.	23
Miller & Company, Geo. M.	
Mississquoi Marble Co., Ltd.	84
Mitchell Company, Limited, Robert	92
Montreal Locomotive Works Limited	83
Morrison & Company, T. A.	96
Munderloh & Company, Limited	92
Mussens Limited	4
Myers, Oakley	83
Napanee Iron Works	17
National Bridge Company of Canada	93
National Iron Works Limited	95
National Pipe & Foundry Company	94
Neptune Meter Company	18
Noble, Clarence W.	73
Northwestern Terra Cotta Company	89
Ontario Asphalt Block Co., Ltd.	98
Ontario Sewer Pipe Company	20
Ontario Wind Engine & Pump Co.	83
Ormsby Limited, A. B.	34
Oshawa Interior Fittings Company	
Owen Sound Iron Works	
Pacific Coast Pipe Company	1
Paterson Manufacturing Company	15
Pedlar People	29
Phoenix Bridge Company	89
Piggott & Company, Thomas	
Pinchin, Johnson & Company	102
Power & Son	
Provincial Steel Company	26
Queenstown Quarry Company	95
Reid & Brown	96
Rhodes Curry Company, Limited	99
"R.I.W." Damp Resisting Paint Co.	19
Rogers, Limited, Alfred	11
Roman Stone Company	30
Royce Limited	24
Sackville Freestone Company, Limited	77
Sand & Supplies Limited	94
Sarnia Bridge Company, Limited	93
Sawyer Belting Company	13
Sheldons Limited	18
Sheppard, James	81
Silcox, A. B.	
Slack & Company, T.	101
Smart-Turner Machine Company	1
Smith, Limited, Thos. & Wm.	86
Smyth & Ryan	89
Standard Ideal Company	36
Standard Steel Construction Co.	93
Standard Underground Cable Co. of Canada.	
Stanley Company, W. F.	
Star Expansion Bolt Company	
Steel Company of Canada	26
Steel & Radiation	8
Stinson-Reeb Builders' Supply Co.	
Structural Steel Company	92
Sturtevant Co. of Canada, Ltd., B. L.	27
Taylor J. & J.	
Thew-Automatic Shovel Company	23
Toledo Wheelbarrow Company	
Toronto Plate Glass Importing Co.	1-89
Toronto Iron Works	98
Trussed Concrete Steel Company	90
Tuec Company	
Turner, C. A. P.	
United States Steel Products Co.	31
United Typewriter	35
Urschel-Bates Valve Bag Company	82
Waterous Engine Works Company	75
Weeks, Arthur L.	96
Welch & Company, H. J.	96
Western Canada Contractor	90
Western Wheeled Scraper Company	13
Wettlaufer Bros.	10
Woodstock Wind Motor Company	91
Woods Limited	98
Wood and Service	96
York Sand & Gravel Company	90

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Prompt shipment from Montreal or Napanee stocks.

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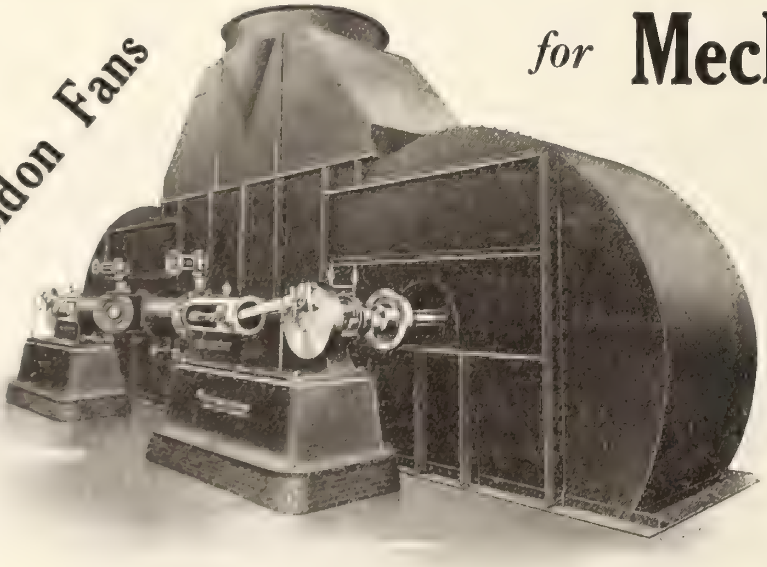

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They can also be used for exhausting Smoke, Fumes and Gases from Dye Houses, Chemical Factories, Mills, etc.

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"TOXEMENT"
"CEMENT FILLER" and "CEMENT FLOOR PAINT"

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ESTABLISHED 1848

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For application to the inner surface of exterior brick or masonry walls, above grade level. Prevents the penetration of dampness. Saves the cost of furring and lathing.

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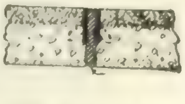
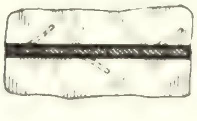


Cross-Section of Pavement Showing Expansion Joint

Baker Armored Concrete Pavements



Longitudinal Section Showing Joint.

These concrete pavements have been in use so long that they have made an unrivaled record for service and efficiency. The shear members tie each plate securely to the end of the pavement slab. The expansion joint space between the protected edges of adjacent slabs is filled with felt, asphalt or other joint filler.

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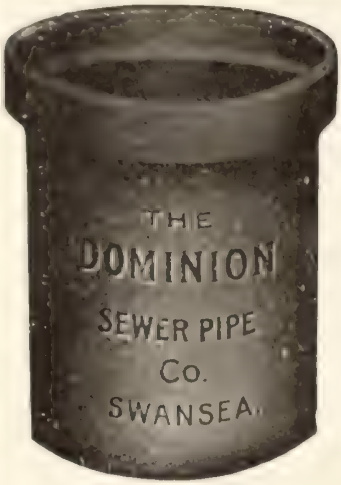

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TELEPHONE (Toronto Connection)
PARK 1809

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(The Independent Co.) **Limited**
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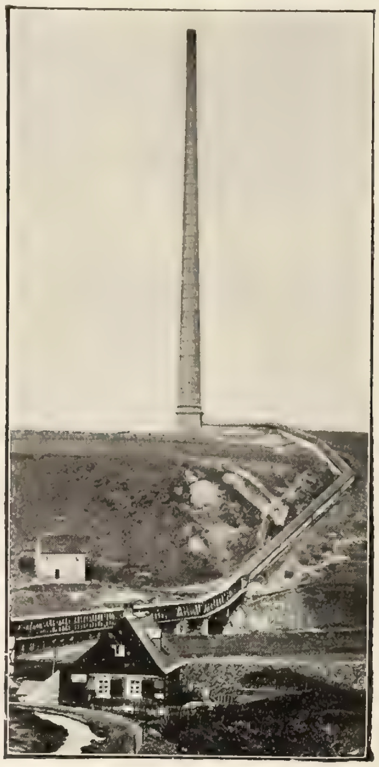

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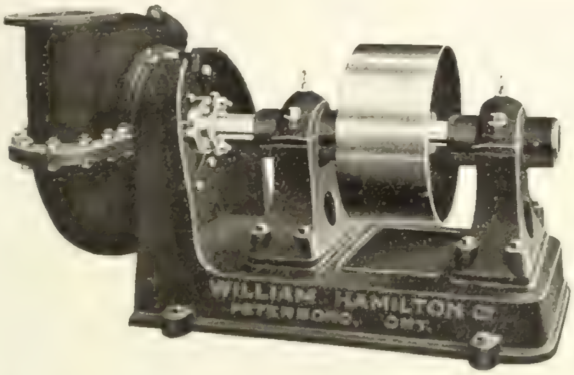

Centrifugal Pumps

Notice that in our pumps the shell is split horizontally and the housing is open at the top. This permits of the pump being easily taken apart for cleaning without disturbing the piping.

There is also room enough between the pulley and bearings to prevent any oil dripping on the belt.

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Peterborough, Ontario

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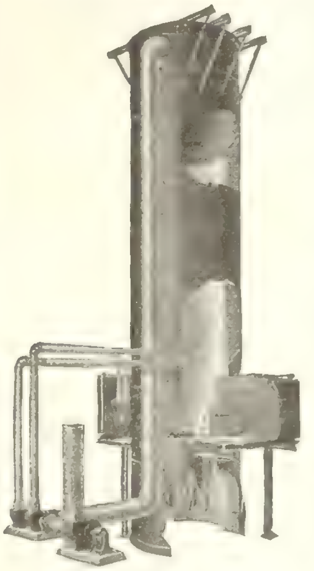

We are prepared to install complete plants for lime burning, realizing the highest economy not only in the burning of the lime but also in quarrying the rock and delivering it to the kiln.

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HAMMER
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HILLSBOROUGH, N.B.

It neither loosens nor falls off, it allows carpenters to follow plasterers without loss of time and lasts as long as the building.

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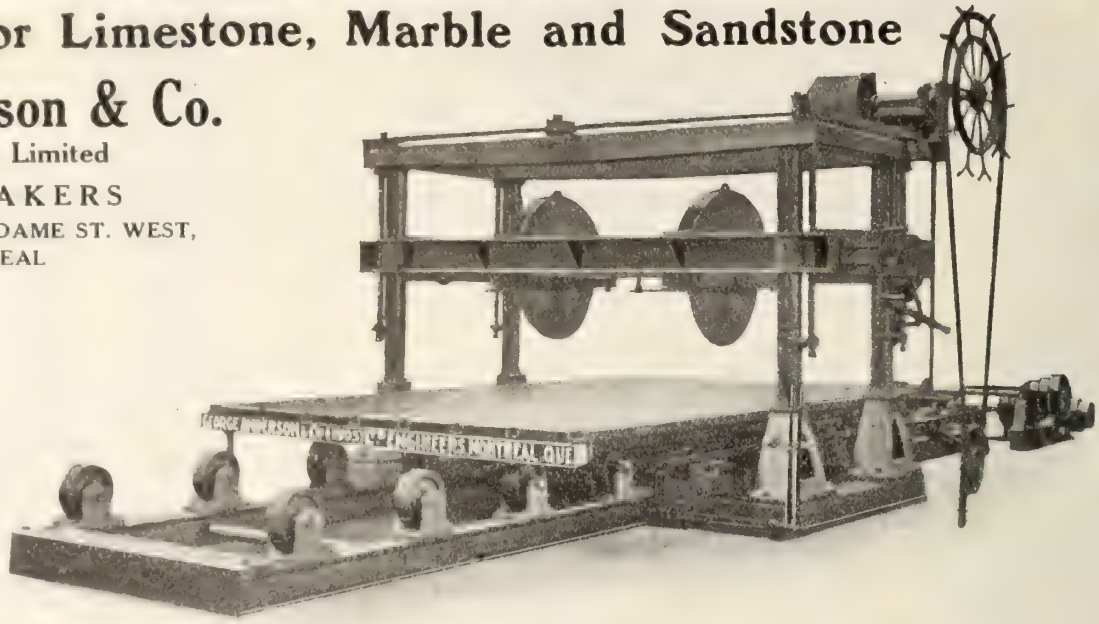

Anderson's Rising and Falling Diamond Saw, made under British and U.S.A. Patents 209179, 657262 **SINGLE AND DOUBLE TABLES**

About 50 of the above Machines at work in Canada

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is being used today on large excavating jobs. It does the work rapidly and with only a few men—which means a low cost per yard. With the Brownhoist Drag Line Bucket the operator of the crane can dump the load at any point along the boom—or the bucket will dump automatically at the end of the boom. The crane is shown here on the New York Barge Canal.

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Records show where the crane has been used day and night for months at a time without stopping for repairs. This appeals to contractors because loss of time is expensive.

We furnish this equipment up to 100 ft. booms and 3½ yd. bucket.

Write for detail information.

The Brown Hoisting Machinery Co.
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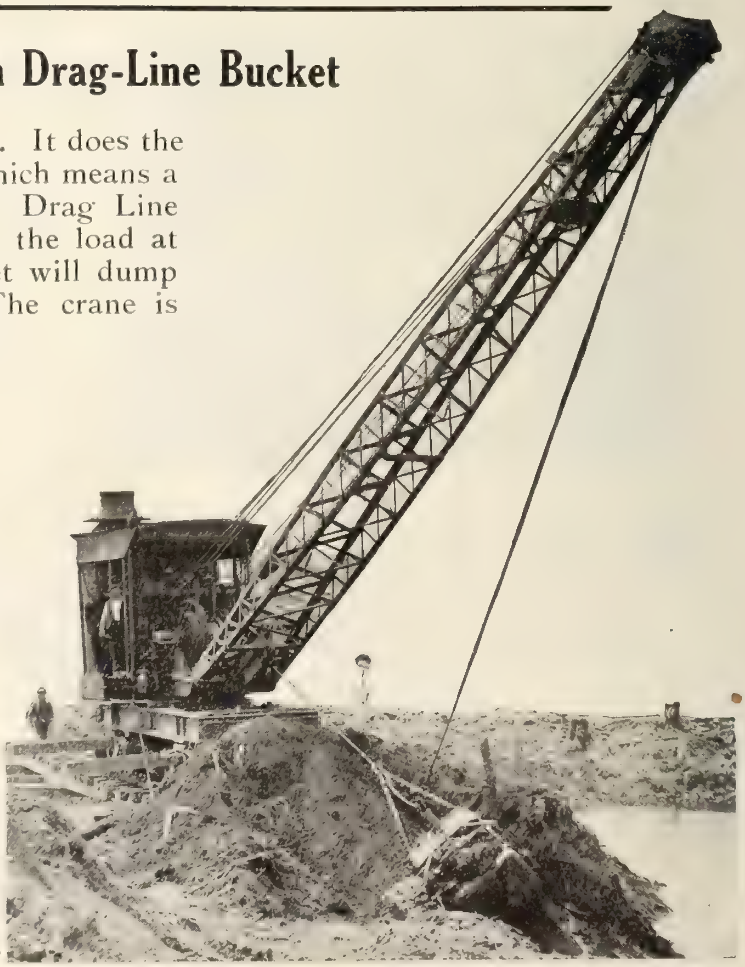

17 City Engineers

tell their good opinions about "Canton" Shale Paving Brick in a Booklet

"What Experts say about Metropolitan Paving Brick"

Write us for Booklet—It's Interesting

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"Best Paving Block Made"

"Metropolitan Block" Make Permanent Pavements

The Metropolitan Paving Brick Co. - - - Canton, Ohio, U.S.A.

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By Using a

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for that EXCAVATING CONTRACT

The contractor with men and teams cannot compete successfully with the man who owns a THEW SHOVEL.

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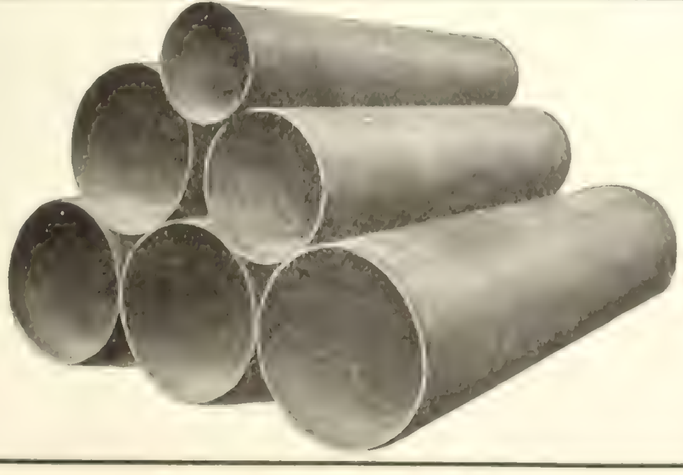
The Thew Automatic Shovel Company, Lorain, Ohio



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MADE IN SIZES

12 to 72 inches Diameter

Used extensively for Water Supply for Mines, Mills, Hydraulic Operations and High Pressure Hydro Electric Installations.

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FORGED STEEL FLANGES

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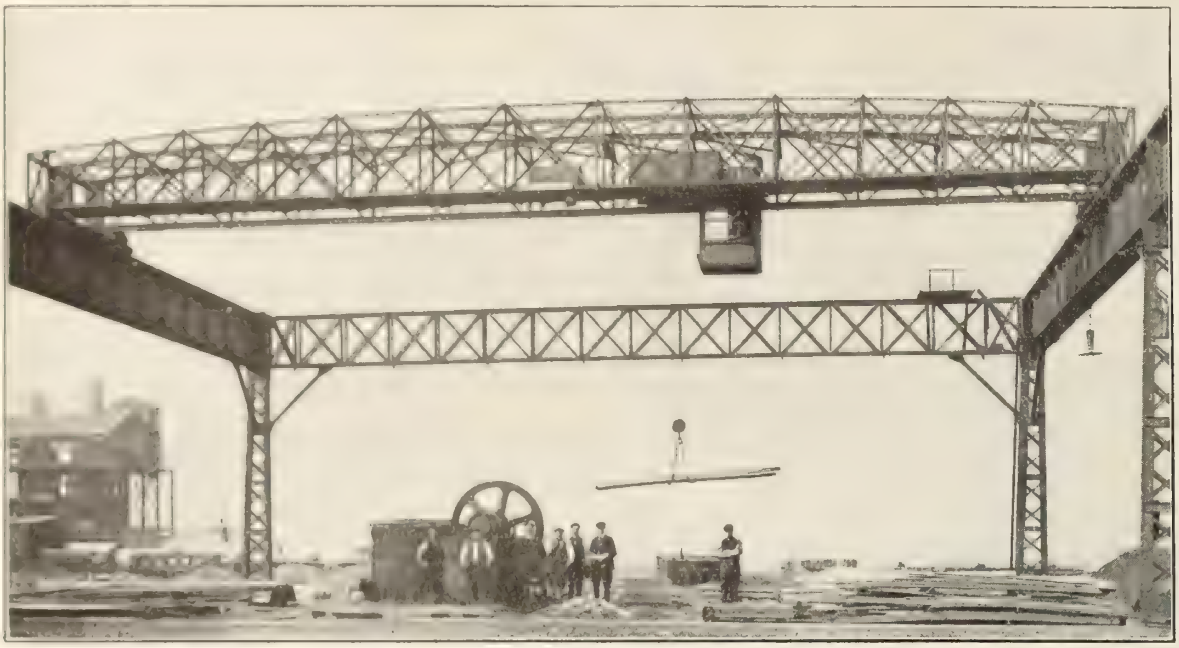

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Royce
Electrical
Cranes
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CRANES TELFERS CAPSTANS WINCHES

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Neat
Hardwall Plaster

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60,000 tons shipped in last twelve months

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WE ARE PREPARED TO UNDERTAKE ANY WATERPROOFING PROBLEM

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and possess the highest efficiency at the lowest cost of any method of waterproofing.

No waterproofing, regardless of cost, is more efficient on important concrete engineering such as tunnels, foundations, sewers, bridges, reservoirs, dams, tanks, swimming pools, water-towers, floors, cellars, walls and roofs.

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We make
20 lb. Section Rails
25 " " "
30 " " "
40 " " "
50 " " "

RAILS

75 Tons 25 lb. Rails, Ready for Shipment
275 " 30 " " "

We hold stocks of
20 lb. Fishplates
30 " "
40 " "
60 " Angle Bars
80 " " "

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Annual Capacity 12,000 Tons

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(Independent of all mergers)

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For Reinforcing Concrete

Plain Rounds

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Twisted Squares

Cross Arm Braces, Plain and Galvanized.

We can ship from stock

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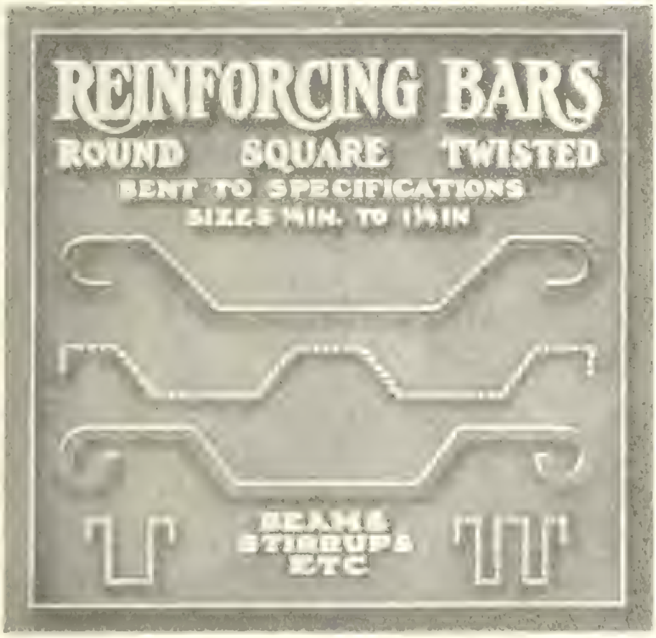

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Angles from ¾ x ¾ in. up to 2 x 2 ins.

Round and square from ⅜ in. up to 1¼ ins.

Flats from ¾ in. up to 4 ins. in width, and other special sections.

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For VENTILATING and COOLING

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They will quickly change the air in factories, workrooms, kitchens, billiard halls, etc., carrying away the smoke, fumes, hot air, keeping the atmosphere sweet and cool.

The electric fans are equipped with motors wound for either alternating or direct current. *Ask for Bulletin No. 116 Z.*

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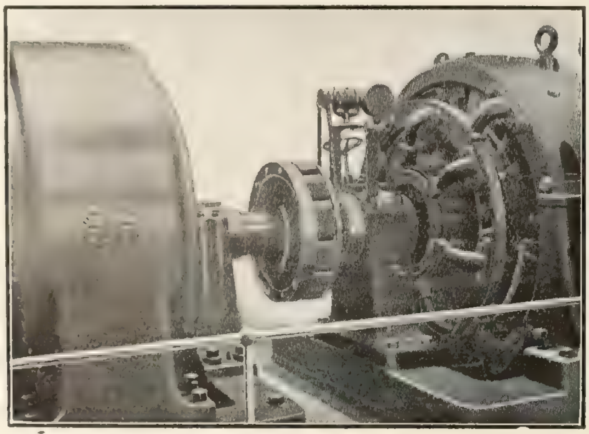

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- Centrifugal Pumps
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- Steam Engines and
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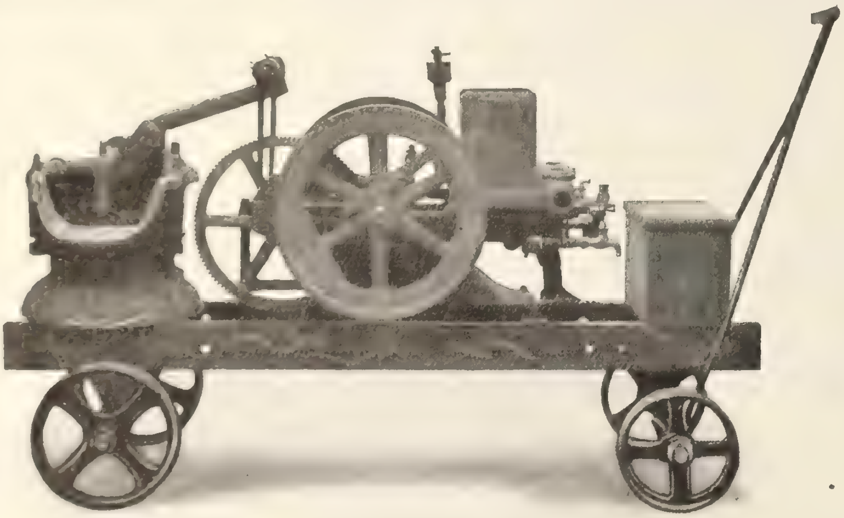

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CAPACITY 3″ SUCTION		COST OF OPERATION
3,500 gallons	per hour	2 cents
35,000 "	" day	20 "

Let us demonstrate this to you.

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Ottawa, Ont. Toronto, Ont. Winnipeg, Man.

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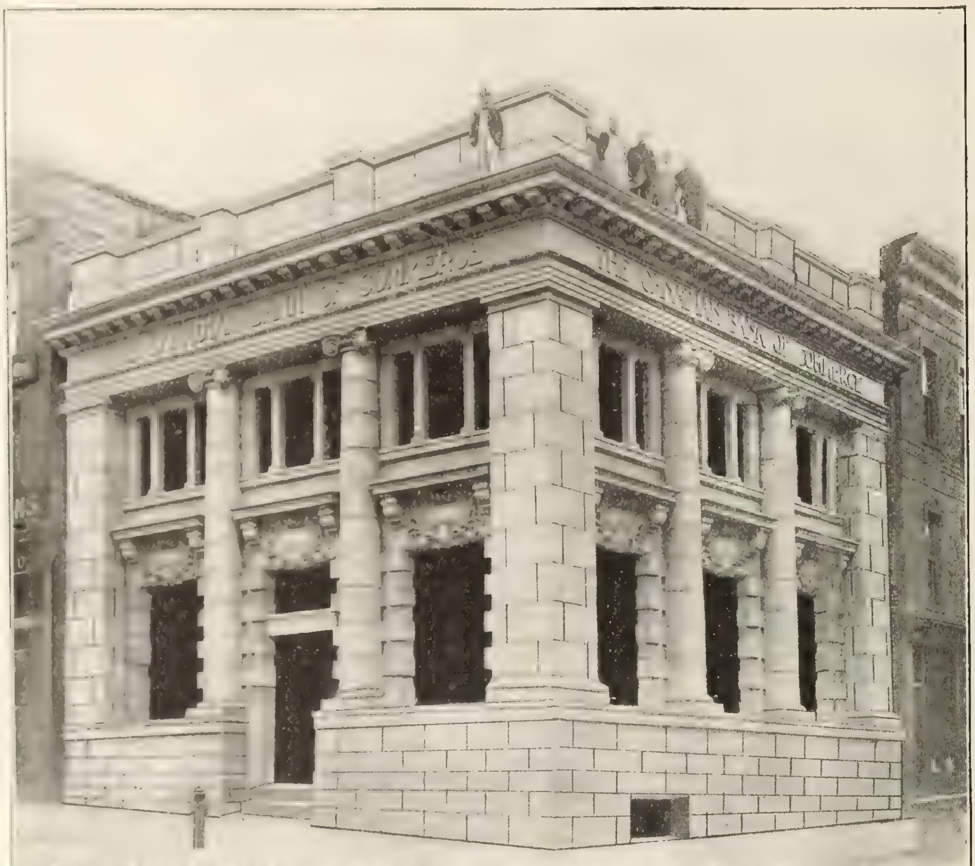

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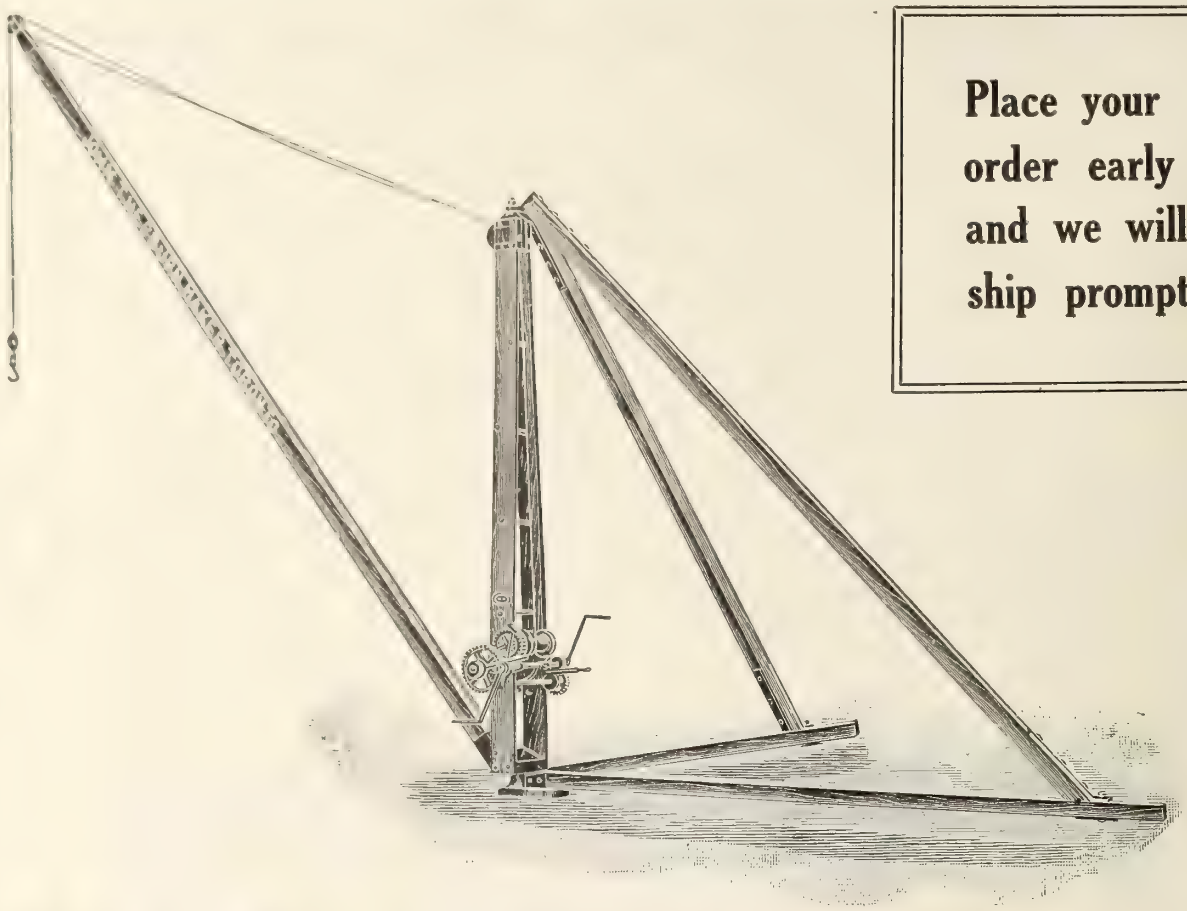

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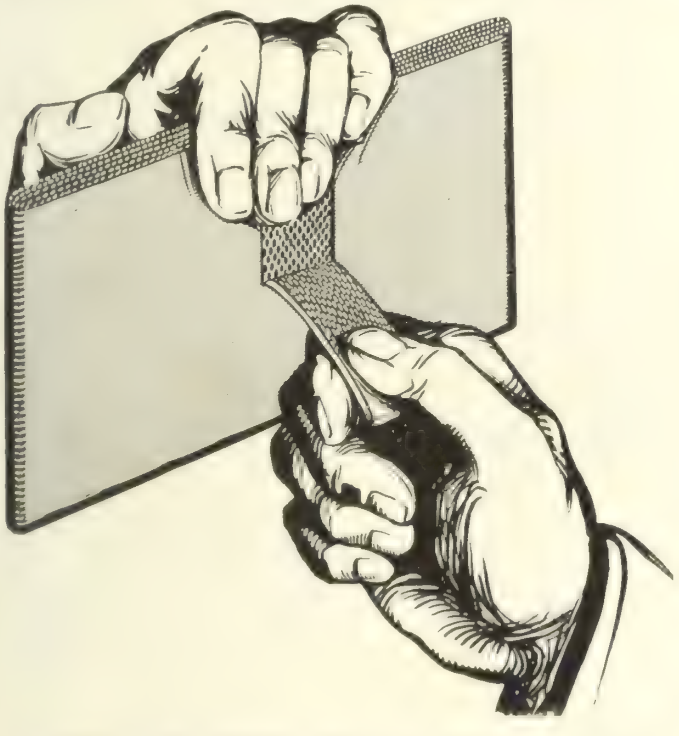

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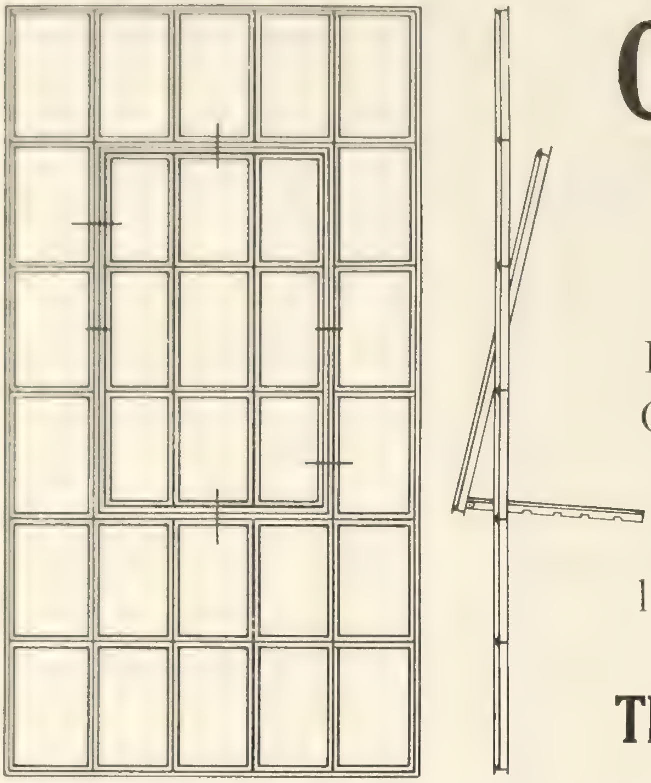

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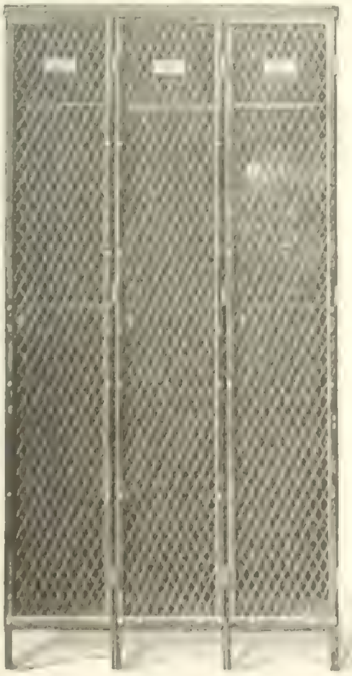

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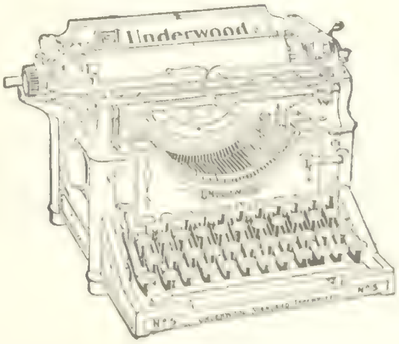

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Standard Ideal Incinerators are made in two types:

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Published Each Wednesday by

HUGH C. MacLEAN, LIMITED

HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
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SUBSCRIPTION RATES

Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 27 January 8, 1913 No. 2

An Election Post-Mortem

NOW that the butchers, the bakers and the candlestick-makers are receiving the congratulations of their friends and near-friends, and the newspapers are fortifying themselves by prosy effusions concerning the outstanding qualifications of those who have obtained the right to sit upon Boards of Control, city councils and other places where men spend other men's money, it is timely to consider whether there is taking place any improvement in the constitution of these governing bodies in so far as the constructional field is concerned.

It is all very well to say that the newly-elected mayor or the councillor stands for progress—spelt with a capital P—but it would surely be more convincing if proof were brought forward as to the ability of these men to carry into effect the progressive programmes outlined.

As a single instance, the city of Toronto was to accomplish great things at this last election, but we can congratulate it only on the choice of mayor and the few changes in the council. We do not wish to be pessimistic, but we do not find more than one-third of Toronto's administrators equal to the responsibility of guiding Toronto's destiny through the eventful year of 1913 when a conservative and yet progressive policy is called for in the expenditure of millions of dollars in public and municipal improvements.

Can the best results be expected from a body of men built up in such miscellaneous fashion?

It is argued without much point that if a man can make a success of his own business, his part will be a successful one in the administration of the city's affairs. Looking down the occupation list of Toronto's new council we cannot but think that certain avocations may be classed as exceptions.

We have no grievance of a particular kind. Our objections are general rather than directed at certain persons. The aldermanic and embryo-aldermanic utterances of the last few weeks have tired us. We have heard them before. They are the old year's resolutions dished up anew. The process is repeated year in and year out.

Examine Aldermen or Revolutionize System?

All this is introductory to a question raised by a correspondent of this journal who comments upon the fact that in a day of keen competition the system of examination has crept into practically every branch of business life except civic. Our correspondent writes:

> "Why should an alderman, who has the important duty of directing the expenditure of public money, be exempt from even an elementary test to prove his capacity? Is not this the reason why there is generally so much dilatoriness and lack of business method in the management of civic affairs? Look at the men who are to be found everywhere in city and town councils—uneducated and narrow-minded, and ignorant of the nature and scope of the duties of the unfortunate civic employees who, by the present system, are under their control. Such men consider it their privilege to criticise the work of engineers and specialists, whose 'masters' they suppose themselves to be.
>
> "The Council has freedom of action, immunity from responsibility and power for good and evil, which should only belong to the highly trained. The fact that councils are re-elected at stated intervals relieves the mind of any individual alderman and leaves the blame for mistakes on the permanent official who has acted according to instructions. The burden of all this mismanagement falls eventually on the shoulders of the ratepayer, who is thus punished for his poor judgment in electing his representative. But what power has the average ratepayer to pick out the proper person for election
>
> "A preliminary examination by a competent authority would do away with many of the difficulties and weed out undesirables. Let all candidates be tested before election, and the electors be advised to select their representatives from the successful ones. Business ability and fitness to manage public affairs should be examined. Many busy professional men would object on the score that they have no time to acquire expert knowledge. Such men, however, would not make desirable aldermen; for it is conceded that those who aspire to civic honors should be ready to spend at least as much time in preparing for candidature as they would have, after election, to attend to public business.
>
> "Test the prospective alderman, then, and so get a man who has both the time and the ability to properly manage civic affairs."

There is sufficient point in our correspondent's letter to merit consideration, but, of course, his suggestion is impracticable, and in fact, we take it as being made only for the moral that it contains. The question that occurs to us is whether our growing cities would not obtain better results and make fewer bunglers under the commission form of government. Can success reasonably be looked for if incompetents be given a hand in mapping out the lines of our development and the expenditure of our millions

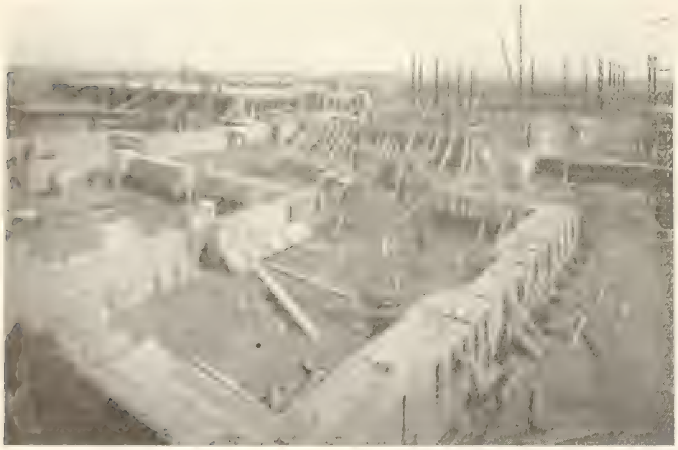
The New Legislative Building at Regina

Monumental Structure of Classic Proportions Now Nearing Completion—Typical of the Growth and Progress of the Western Provinces—Features of Design and the Record of Construction

Specially contributed by J. H. Puntin, Licentiate R.I.B.A., Resident Architect

THIS building, just at the point of completion, is of interest not only to the technical reader, but to that wider range of public thought which sees in this monumental work a typical example of the unparalleled growth of the Prairie Provinces.

A decade or so ago known to the world as "The Great Lone Land," a fitting phrase for the boundless expanse of wind-swept prairie, bare to the distant sky-line; in winter, a land of white stillness, so intense that the snapping crack of creek ice, contracting in the zero temperature, would break the silence with an intensity startling and almost uncanny; now in 1913, a well built and prosperous city, spreading rapidly upon the settled wheatfields all around, a business section containing some of the finest buildings between Winnipeg and Vancouver, with municipal electric light and tramcars, banking facilities second to none, miles of broad well paved streets and touched by three transcontinental railroads, Regina is indeed a fitting capital city for what is destined to be the leading grain-growing province of the Great West.



General view, east wing, dome and south wing. May 5, 1909

As the population increased, the old Government of the North-West Territories gave place in 1905 to the present Provincial Government of Saskatchewan, meeting at Regina. But the old and historic House of the Legislative Assembly, owing to the yearly increase of legislative and administration work, became at first inadequate and next impossible, and, with characteristic western energy, the Government, with the Hon. Walter Scott as Premier, took up the question of a fitting house for the Assembly and the attached Departments of the Public Service.

In 1907 invitations were issued to seven firms of architects to submit designs in accordance with certain conditions. Mr. Bertram Goodhue, of Messrs. Cram, Goodhue & Ferguson, New York, and Mr. Percy E. Nobbs, Professor of Architecture at McGill University, were the assessors appointed.

Messrs. E. & W. S. Maxwell, of Montreal, were ultimately awarded the work on the undoubted merit of their design, and in the following year tenders were called and the work was commenced by Messrs. Peter Lyall & Sons, of Montreal, at a contract price of $1,400,000.

The new buildings are situated just south of the Wascana Creek, and about a mile south of the business centre of Regina.

The roadway over the creek is carried on a concrete bridge with dam, thus forming a large sheet of water between the buildings and the city. This, in conjunction with the ornamental gardens and grounds, some 160 acres in area, forms a most imposing setting and gives the building enhanced dignity.

The structure is cruciform in plan, with its longest axis east and west, facing north. The length over all is 542 ft. 8¾ in., breadth of east and west wings, 73 ft. 7 in., while in centre the breadth is 263 ft. 5 in.

Generally, the building is four storeys in height, the height of each storey being respectively 12 ft. 6 in.; 14 ft. 8 in.; 19 ft. 0 in.; and 13 ft. 0 in. At the crossing is placed the dome, which, rising from a base some 50 ft. square, reaches a height of 183 ft. 8 in. above the ground.

LAYOUT

A flight of granite steps leads to the main entrance in the north wing, which is impressively treated as a pillared portico in free Classic style. From the main entrance hall the marble staircase leads to the great colonnaded rotunda placed immediately under the dome.

Forming as it does the anti-chamber to the Legislative Hall, marble and mural work enters freely into its decoration and, added to its lofty height of 65 ft., this results in an impressive interior. Italian, Grecian, Swedish and native marbles all contribute their beauty in a glorious harmony of color and form.

The Legislative Chamber is entered from the rotunda on the south and forms the south wing of the building. The Chamber contains future provision for 125 members. As the present Assembly is composed of 54 members, ample margin is thus provided for.

Public accommodation is provided in two spacious galleries situated at sides of the chamber. There is a press gallery to hold 40. A speaker's gallery, seating ladies and invited guests, is placed over the Speaker's chair and the Bar of the House respectively.

The remainder of the building is devoted to the various Committee Rooms and Executive Departments, all having ample vault accommodation, there being no fewer than 51 vaults provided for in the building.

CONSTRUCTION

With the exception of the Legislative Chamber and south wing generally, where it was found advisable to adopt steel construction fireproofed with concrete, reinforced concrete is the chief feature throughout the construction.

Although not a true skeleton construction, with the usual external wall veneers—for the outer walls are too massive and in some cases assist in carrying floor loads—yet in practice the system adopted in building was to proceed first with the reinforced skeleton, afterwards following in with the main walls, temporarily supporting floor slabs until the walls were pinned under same at the few points where the drawings made this necessary.

Foundations.—Owing to the nature of the subsoil, a nature peculiar to the Regina District, concrete piling was adopted for the carrying of footings. This subsoil is in appearance a black loam and is known among western contractors as "gumbo," probably derived from its stickiness when wet. It exists to a great depth under the city of Regina, and forms a difficult problem in foundation work, as its nature when dry is slightly elastic and by extended trial is not found good for a distributed load of more than 2,000 lbs. to the square foot.

Parliament Building, Regina. General view from N. W. corner. Oct. 6 1909

Piling.—The Raymond Concrete Pile Company commenced driving on August 31st, 1908, and completed the 3032 piles under the building and power house on November 14th, giving an average number of 46 driven daily. Each pile core was driven by a steam hammer, weight 3200 lbs.; length of travel 25 ft.; steam pressure per sq. in. 80 lbs.; number of blows to the minute 65. The core in each case was driven until the last 22 blows drove the pile one inch, and resulted in an average depth per pile of 16 ft. This piling had to sustain, under guarantee, a load of 25 tons on each pile head. An interesting series of tests was carried out to establish this condition of contract.

Concrete Construction.—The foundation on top of the concrete piling having been executed at the end of the season of 1908 and covered up with manure and earth to protect as far as possible from frost, the work was shut down for the winter and was resumed as early as possible in the spring of 1909. The actual day of opening for resuming concrete was April 17th.

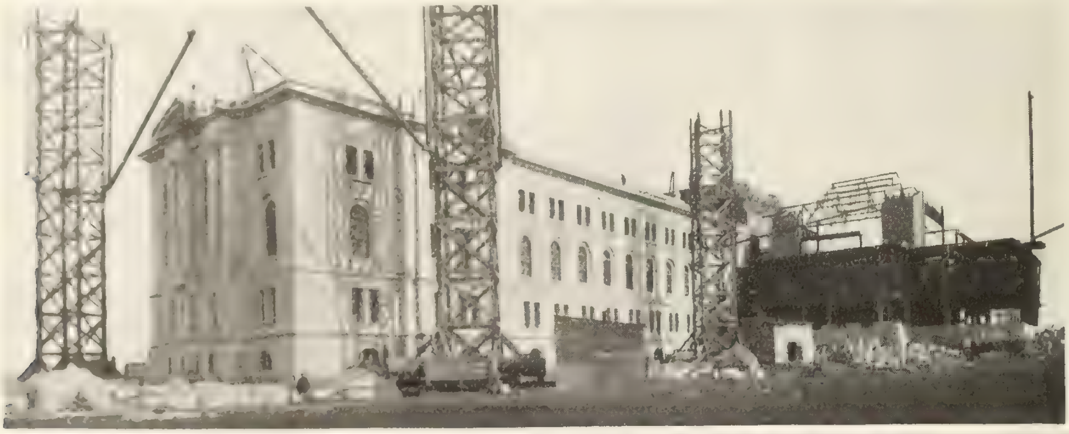
PLANT AND EQUIPMENT

A Smith mixer, of a yard capacity, was set up a little to the west of the main entrance in the centre of the north front and between the railroad track and the building. The mixer was fed from a mixing platform over, which received the cement in bags from a travelling conveyor, from cement store outside of mixer. Over the platform a gravel bin of a capacity of some 70 cubic yards was erected, fed in turn by a self-tipping car travelling in an inclined tramway from the gravel cars on railroad track up to the bin.

The measuring of material on the mixing platform was arranged for by measuring the gravel as it passed on its way from the bin to the mixer below and adding the requisite number of bags of cement, before the dry mixture poured into the drum of the mixer. The concrete was then dumped from the mixer into a self-tipping truck conveyor of one yard capacity, running on rails to a tower hoist by which it was elevated to the different floors in a balanced bucket and shot through hoppers into the concrete carts at the different floors, each holding about 6 cubic feet, where men conveyed the same over wood runways elevated about 2 feet above the floor and deposited in position. This method proved to work without a hitch

General view from south of building, July 23 1909. Exactly one year from starting once it was in running order. The advantage of the slightly elevated trestle runways—thus keeping traffic clear of the reinforced steel laid on the floor—is obvious.

With the plan going in good order, as much as 350 yards was run in a day. One of the most sustained runs was as follows: 1909, July 5th, 333 yards; July 6th, 298 yards; July 7th, 166 yards; July 8th, 130 yards; July 9th, 130 yards; July 10th, 177 yards; total for the week, 1234 yards. By October 4th, the date on which the foundation-stone laying ceremony was performed by His Excellency, Eary Grey, such rapid progress had been made that the skeleton of the main building, including the roof slab, had been completed up as far as the drum base of dome. On the 7th of that month, however, night frost began to make its appearance, showing that the end of the season was drawing near, and it was decided not to proceed with the dome until next year, a temporary timber roof acting in the meantime.



Parliament Building, Regina. Constructional progress on the west wing, from S.W. April 4, 1910

Excluding the concrete in piles, the total amount of concrete poured since the commencement of the work is 14,767 cubic yards in walls, columns and slabs. Considering the winter seasons of 1908-9 and a working time of eight months only, the figures show a good record for this class of concrete building construction.

In August, 1909, the reinforced concrete work having made good progress towards the roof, a commencement was made with the setting of Tyndall Stone masonry, which forms the facing to the composite external walls. This work of enclosing the west wing was pushed along right through the following winter, due precautions being observed both in the storage and the setting of stone to protect his work from any possible injury by frost.

A comparatively mild winter assisted progress materially and with the exception of an interval of some seven weeks in the beginning of the year, when a labor dispute occurred, masonry work advanced without interruption. As much as 1200 cubic feet of stone was set a day. Taking the average quantity contained in a car as 400 cubic feet this daily amount set represents 3 car loads.

As the enclosing of the west wing proceeded storey by storey, the heating engineers, who had previously completed the boilers and steam heating plant in the power house, were enabld to turn on heat, thus allowing plastering and other internal work to be proceeded with.

Work then proceeded simultaneously on the exterior of the east and south wings, also on the dome and in the interior of the west wing, having a crew of 280 men on the daily payroll, with a progress estimate value of work and material at some $60,000 a month.

During the year 1910, construction on the Legislative and Department Buildings advanced steadily towards completion. The earlier portion of the time being the summer and autumn of 1910, witnessed an exceedingly active period in the history of the work. The masonry walls of the south and east wings, the steel and concrete framing for the north wing, and the interior finishing of the west wing and power house, together with the concreting of the dome were pushed forward simultaneously, this necessitating a

Parliament Building, Regina. South and east wings, from S.E. June 15, 1910

East and north wings, from N. E. Aug. 1, 1910

large executive and inspecting staff, who were one and all kept going at high pressure.

A strike of union masons and bricklayers, which occurred in sympathy with trouble in the East, retarded work considerably during August and September, 1910, arousing at one time anxiety as to the completion of the walls and roof of the east and south wings as protection to the interior during the following winter. However, the difficulty was surmounted and in October work on these trades was being steadily advanced. By November the south wing, east wing and dome were enclosed sufficiently to allow of interior work proceeding.

Fairly mild weather in the earlier portion of winter assisted the construction of the north wing, this being the last wing to be erected. By carrying up the masonry exterior walls storey by storey at the same time as the concrete floor slab above was completed, it was possible to heat the interior space thus enclosed, thereby facilitating progress materially. During the week ending January 27th, 1911, the chimneys of the north wing were topped off, thus completing the setting of masonry on the building.

While external work was proceeding at these points, interior work on the west wing and the heating and lighting arrangements in the power house were moving forward actively. By the third week in November, 1910, it was possible for the Government to take possession, and the removal from the old offices in the city to the new building took place.

A spell of severe weather during January, 1911, caused inconvenience both to the newly installed staff and the contractors. This was complicated by the bursting of the water main supplying the building from the city. By energetic effort, in a temperature of 25 degrees below zero, the trouble was located and repaired and more comfortable conditions were again resumed.

Floor test. Concrete beam 14 x 30 x 27 span, load 40 tons, deflection 1/8 of an inch.

Work on the first floor of the east wing was given special attention as to progress during this period. This enabled the Legislative Assembly to meet in the building on January 17th. The reading and stack rooms were utilized temporarily for the session.

The intervening period has been occupied largely in the finishing and decorative features and to-day the building is practically complete—after some four and one-half years continuous effort.

HEATING, PLUMBING AND VENTILATING

In any modern building these items bear an increasingly important part. A full description of the plant in operation would furnish a long article alone.

A separate power house is provided, connected to the main building by a tunnel, 7.0 x 4.6, in which the steam, electric light and power mains are led.

Power is generated by 4 Leonard horizontal engines direct connected to generating units, and exhaust steam is used for heating purposes, any excess going through the boiler feed water heaters. All the radiators are on vacuum with Webster valves, automatically controlled by the Johnston Regulator system, which is installed throughout the building.

The ventilating is accomplished by four air intakes in the basement. Air is forced through Webster air washers and eliminators, over reheaters, and is then blown by fans through ducts to every portion of the building. Four exhaust fans on the roof extract foul air from each room and discharge into open through copper exhaust heads.

Parliament Building, Regina. Construction practically completed.

A popular feature of the building is the members' dining room, in which meals are served daily. The kitchen has been equipped on modern lines, with refrigerator and cool room installed by the Linde-British Company. The ranges, hot tables, dish washers, etc., are the work of Messrs. Kerr, of Montreal.

Since the building was erected it was subjected to the doubtful distinction of having to bear the full force of the disastrous cyclone which devastated Regina on June 30, 1912. It is a pleasure to all of us who had the responsibility of the building at heart to note how well the mighty fabric withstood the blast.

The roof of the power house was carried away; certain 4-in. hollow block partitions of the interior of the building were blown down, and glass was broken, but the building itself was left intact. It is interesting to note that the power house chimney, 130 feet high, a circular stack built by the Alphonse Custodis Company, with their patented radial block, passed through the ordeal scatheless, although in front of the building a train of box cars, loaded with cement, were lifted clean off their trucks and deposited bottom up some distance away.

The Provincial Government Department of Pub-

[illegible] had a resident architect and several inspectors on the work. Messrs. E. & W. S. Maxwell, the architects, were represented by Mr. J. E. Fortin. Messrs. [illegible], [illegible] and [illegible], with a large staff of competent engineers, formed the executive for Messrs. Lyall & Co., the contractors.

The structural concrete was executed on the Kahn system by the Trussed Concrete Steel Company. Messrs. Ballantyne, of Montreal, were responsible for the plumbing and heating. Messrs. Hastings & Willoughby, of Regina, carried out the roofing, tin and copper work. The plastering is by Messrs. C. W. Sharpe & Company, of Winnipeg; the painting and glazing by W. Talbot, of Winnipeg, and the furniture and decorations by the Bromsgrove Guild of London, England, Messrs. Waring & Gillow, Messrs. Castle, and others.

The twelfth day of October, 1912, witnessed a very brilliant gathering in the building, when H.R.H. the Duke of Connaught, dedicated the building to the public service. To those of us who had seen the structure grow day by day in summer heat and through all the frozen severity of the winter in the North-west, and who had passed through rain and sunshine, hail, snow and tempest to advance this monumental work to completion, the opening ceremony and reception in the Assembly Chamber formed a fitting climax to the years full of effort which for Saskatchewan only marked the beginning of an era wherein lay advancement to her important destiny among the provinces of the Dominion.

Brick Foundations

If there is any place that cement and concrete has advantages, and it is peculiarly fitting to use, it is in the ground in the making of foundations. Brick manufacturers have often conceded this, says The Clayworker, and sometimes in doing so have taken it for granted that it is a cheaper material to build ordinary house foundations with than brick, consequently they have not made much of a fight for this trade.

Talks with some contractors recently, however, developed the fact that while concrete may be cheaper than brick for foundation work in some instances, it is not always so by any means. Where the conditions are peculiarly favorable for concrete, and the brick production is light and the price of brick is high, the balance is in favor of concrete, but in some of our leading cities it is found that brick is really cheaper for ordinary house foundation work. The balance is nearly even between the higher grade new brick and concrete, but by using some of the second-hand hard brick from other buildings one can reduce the cost of brick foundations below that of concrete, and often get a better job out of it, too. This point is worth keeping in mind and going over now and then with the building contractors, because the brick men may be letting part of their trade get away from them that they could hold by proper investigation and effort.

A series of lectures on road building will be given during January at the agricultural college in Nova Scotia. The lectures will be provided by the Public Works Department of the province of Nova Scotia and will deal principally with the improvement of ordinary country roads.

Prize-winning Design for the Buildings of the New University of British Columbia

Architects: Messrs. Sharpe & Thompson, Vancouver

In their plans for the various buildings of the new university of British Columbia, the winning architects, Messrs. Sharpe & Thompson of Vancouver, have followed the Tudor style, though treated in a modern method. Such splendid examples of this style of architecture as are found at Oxford and Cambridge have been carefully studied, the best ideas taken therefrom, and these adapted to the conditions of the Point Grey site.

The site of 160 acres at the south west corner of Point Grey may be justly described as ideal. It is so, in its commanding position overlooking English Bay, in its natural beauty and contours, and in its accessibility to the city of Vancouver. The buildings will be of brick construction, trimmed with Haddington Island stone. Stucco will be used for the upper storeys and slate will be employed in the roofing of all the structures. Each building will be constructed of fireproof material. Great attention has been given to the grouping of the buildings, so that they will show to the best advantage en masse, and at the same time, not be deprived of any of their individual excellencies. The buildings which are included in the plans are, the schools of Philosophy, Law, Mining, Finance, Commerce, Medicine and Pharmacy and the dental college; the men's and women's dormitories, the library, the museum, theatre and students' clubhouse. The whole plan radiates around a great central campus. The main entrance will be placed where the marine drive touches the end of the campus. This entrance will be flanked on either side by handsome lodges, built of the same material as the other buildings.

The first building encountered on entering, is the chapel, flanked on either side by the museum and library. Beyond these two buildings, is the administration building, which dominates the whole plan. Behind the administration building to right and left, and leaving a large open space of campus between, are the buildings of the various faculties, such as medicine, law, mining and others. On the left hand side looking out over the delta of the Fraser, and nearest the city, will be the large stadium with the open air theatre nearby. In the rear of these buildings and separated from them by a campus running from right to left, will be five theological colleges placed in the form of a semi-circle. These colleges will have separate entrances and will be entirely detached, though forming an important feature of the general layout of the buildings.

At the right hand side of the main campus, and in the rear of the colleges, is the women's building, and lady principal's office and residence. On the highest point, and in its own ground, convenient to the different faculty buildings and the administration buildings, will be the deanery. At the rear of the colleges, the fire station, hospital and veterinary building, stock show pavilions and stables will be placed. Across University drive will be the residence of the faculty, while on the other side, and separated from the main entrance road, will be the power house and cottages of the various workmen employed in connection with the university.

Three storeys will comprise each of the main buildings. The administration building however will be higher. Each building will have an entrance passing underneath a tower, in which the porter's quarters will

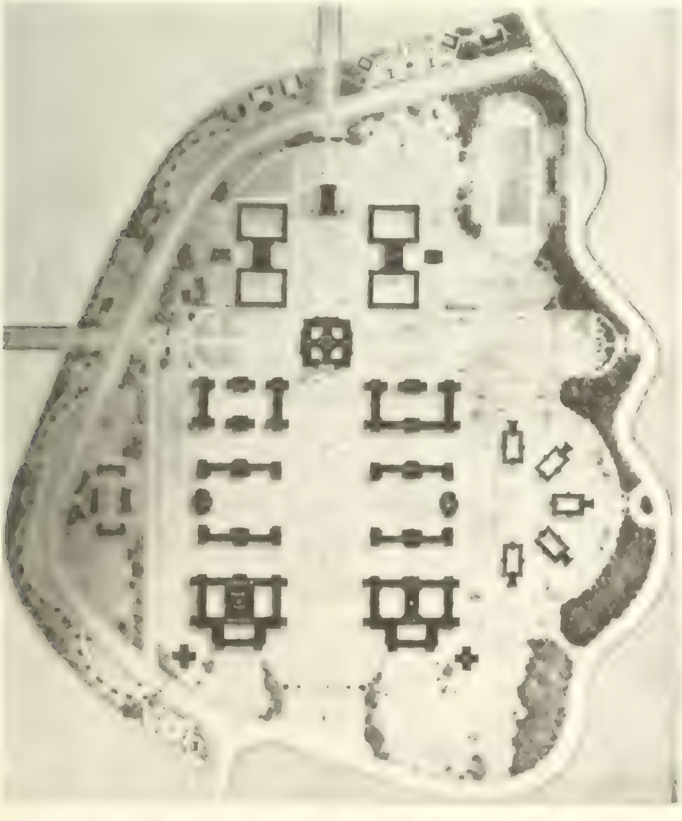
Section of one of the quadrangles of the new University of British Columbia, as it will appear when completed.

be located. This is following the system in force at the various English universities. All the structures of the university will be fitted up in the most up-to-date manner.

The science block will contain the physics building on one side, and the chemistry building on the other, together with the necessary lecture theatres and laboratories. The arts and biology building is to be opposite the science block, in the rear of the administration building.

Separate studies are to be provided for each student in the dormitory buildings, in addition to the sleeping quarters. Bath rooms are provided for ventilation and heating. Dining halls, both large and small, are to be provided in these residence buildings. Kitchens are provided in the rear of these structures, with servants' living quarters above.

In the administration building will be the main offices, the office of the registrar, the principal of the college, and in the rear the large assembly hall. All these departments are to be grouped around a central court in such a way that all available light is taken advantage of.



Ground plan of University of British Columbia. Top of illustration is south east. Marine Drive is seen on the right.

The chapel, museum and library, while of the same material as the other buildings, will be treated in a somewhat richer manner than the colleges and dormitory buildings.

Around the women's building, the location of which has been referred to, are hostels for the women students, and administration offices as well. A ladies' gymnasium and club room will also be provided.

Good Quality of Roman Concrete

THAT there was some standard specification used by the Roman army is claimed by A. T. Bol-stitute, London. In every part of the world ton in a recent paper before the Concrete In-it will be found that Roman methods are remarkably uniform. The great Roman fortress, 1½ miles from Sandwich, Eng., known as Richborough Castle, and covering several acres, is still surrounded by a great Roman wall, one of the best preserved outside of Italy.

It was in this fortress that the Romans packed up on their departure from England. The walls there are about 30 feet high and 10 feet thick, and of great length. When the railways were being constructed the barbarians destroyed the wall which faced toward the sea in order to use the material for the purpose of the railway. They began to destroy the return wall to this sea front by excavating a great cavity at the base of the wall. It is more than high enough to walk into and it extends 8 feet 6 inches in depth, and so leaves only 18 inches of walling beyond. The span of that opening is about 50 feet. There is, therefore, a concrete girder, say, 20 feet in depth and 50 feet span and 8 feet 6 inches in thickness without the slightest sign of a crack. It has stood since the time, probably fifty or sixty years ago, when the cutting was made. In itself that is sufficiently wonderful, but consider of what the wall is constructed. So far as one can see, it is constructed of nothing but the materials on the spot. There are seen the gravel from the beach, flints from the chalk, and the rough class of half stone, any kind of inferior Kentish rag, which could be obtained near the spot, while the mortar binding these miscellaneous aggregates together appears to be made with the ordinary chalk or stone lime.

What is of especial interest, therefore, is what did the Romans mix with that mortar which transformed it into a material as hard as modern Portland cement. Because, inside this enormous wall, 10 ft. thick, the setting and consequent hardness of the concrete are just as good as they are on the outside. That is contrary to experience with ordinary lime mortars.

When the Romans left England, something or other which had been mixed in concrete and mortar or some method of preparation was no longer used, and the Normans, attempting to erect buildings of the Roman character, made a fearful mess of it. Most of their central towers collapsed, owing to the mortar being bad, as it became like sand, and the piers collapsed in consequence. Whether the Romans carried about with their armies puzzolana or volcanic ash, or something equivalent to that in its effects, is not known, but it is a subject worthy of investigation by chemists and societies.

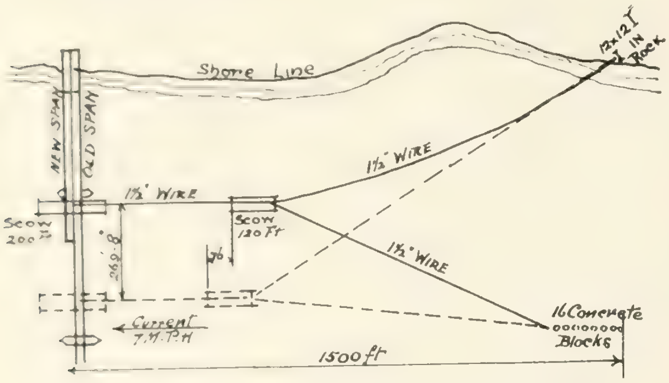
Fort William's new industrial plants are making much progress toward completion. Additional elevator capacity and harbor facilities are being planned. When these various developments are completed the citizens will be claiming the largest manufacturing city of the west.

Double-Tracking the Lachine Bridge

Interesting Project which has Called for Novel Methods in the Solution of Constructional Probems—Placing the Spans

Special to the Contract Record

The C. P. R. are now carrying out a very large undertaking in double tracking the bridge which crosses the St. Lawrence at Highlands, near Lachine, P.Q. The 'work is being done by the Dominion Bridge Company. The new double track bridge is to replace the present single track structure, which is too light for the traffic, and is composed of two single track bridges resting on the old piers, which have been lengthened to suit. The new spans are about double the weight of the old ones, and they are designed for the heaviest traffic. The erection problems throughout have been difficult and many novel methods have been used, but those connected with the placing of the spans across the two 405 ft. openings are of most interest. The main points to be overcome were: (1) depth of water about 40 or 50 ft.; (2) current about eight miles per hour; (3) navigation to be unobstructed; (4) 70 ft. height from water to underside of steel; (5) extremely windy location; (6) in no way to endanger old span.

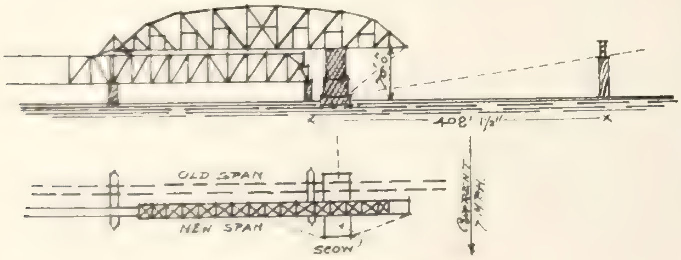


Anchorage of scow. Erection of 408 ft. span

Under these conditions it was decided to erect the two spans on top of the 270 ft. approach deck spans, letting their ends cantilever out about 130 feet, then to haul the spans across the remaining 270 feet, supporting the outer end on a scow and the rear end on slides.

Erection.—Blocks having been placed at the panel point of the lower span, the steel work was erected by a top chord traveller, which was built on falsework by a derrick car.

Erection Traveller.—The traveller was supported on a track laid on the upper chords of the truss. When moving it was supported by wheels, but when lifting the steel, the forward end was blocked up just forward of the wheels and under the main frame. This blocking was kept practically over the panel points. The traveller was of the derrick type with a long boom of 50 feet and a short one of 20 feet, hung in the centre of a swinging A frame, which was held in place by stiff back ties connected to the base frame bypins, which could be shifted so as to keep the A frame vertical as the traveller moved along the cruved chord. The long boom handled all the members except the chords, which were lifted into place by both booms. The heaviest load was 27½ tons.

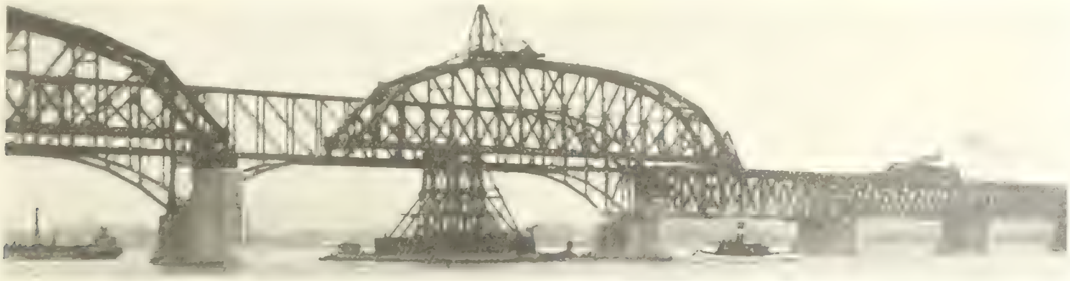


Launching of 408 ft. span

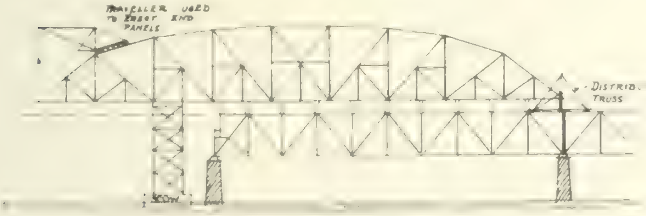
Span showing false-work and scow on which span was floated in

Looking under the span, showing false-work

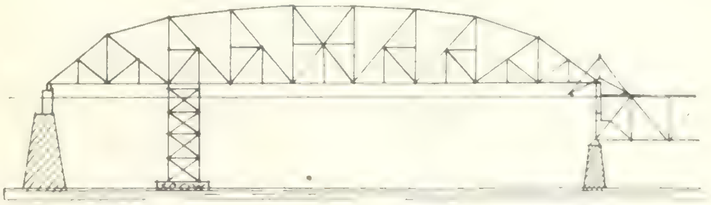
Distributing Truss.—The after end of the 400-foot span was carried on three pairs of shoes, which slid on two lines of four rails each, set eight feet centre to centre. The total load at the after end amounted to 490 tons. This load had to be carried by the floor system of the 270 spans, and to save overloading the stringers and floor beams this load had to be distributed over about forty feet and provision made to allow the floating end to move slightly in a vertical direction and considerably in the horizontal. This was accomplished by supporting the end on a disc bearing placed on the centre line, which in turn was suspended to the top of two pair of inclined struts, which had a shoe hinged to their ends, and were kept from spreading by being connected together by tie bars set at such an angle that the vertical compound of their stresses equalled one-third of the vertical compound of the inclined struts. These tie bars were connected at their intersection to a vertical strut hinged to the remaining shoe. By this arrangement fairly equal distribution was obtained and gave freedom for the shoes to accommodate themselves to any unevenness of the track. At the last 20 ft. of travel the forward shoe ran off the end of the track and in so doing put the distributing truss out of business. Just before this occurred, wedges were driven between the centre shoe and the end F. B. so that as soon as the frame ceased to act, the whole load was thrown on the centre. The end panel of the floor was reinforced for this load.



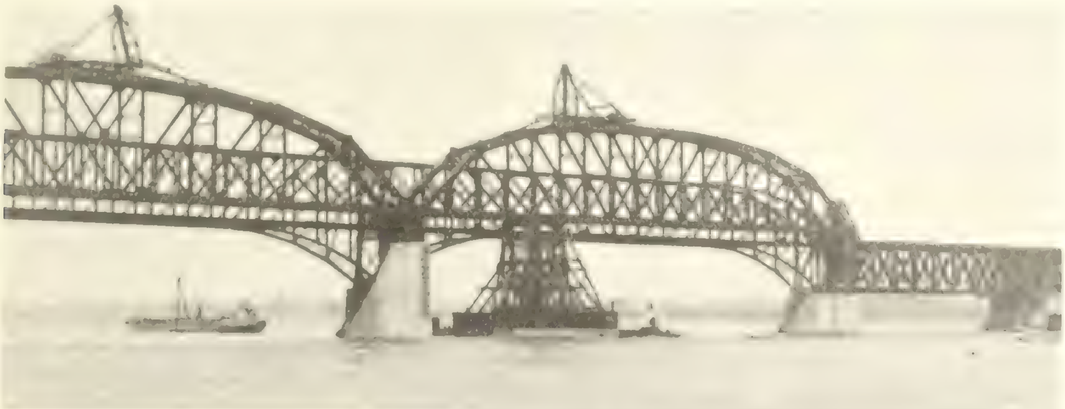
Lachine Bridge—showing span before being moved into position



Truss as erected before launching



Truss in position before lowering



Lachine Bridge—span in position

Scows and Their Falsework.—A special scow 200 ft. long by 37 ft. wide by 10 ft. deep had been constructed, having four steel longitudinal trusses running the full length, with steel lattice cross frames about every 8 feet. Four in B. C. fir was used for the sides, bottom and deck, and heavy timber keelsons and deck stringers were placed between the longitudinal trusses. These scows were built in two halves, and were used by the company until wanted for the bridge, when they were joined together by bolting the projecting ends of the longitudinal trusses together. Three light wooden longitudinal bulkheads were put in to hold the water in case the scows should rock when being placed under the bridge and under water ballast. To better distribute the load on the scows four 100 ft. girders were borrowed, and on these, timber falsework with steel sway bracing was built to reach the trusses, which were some 72 ft. above the water.

Scow Equipment.—This consists of two centrifugal pumps, two valves for flooding the scows, and a valve between the two halves of the scows to regulate the height of bow and stern. A hoisting engine was placed at the stern to handle the anchor lines.

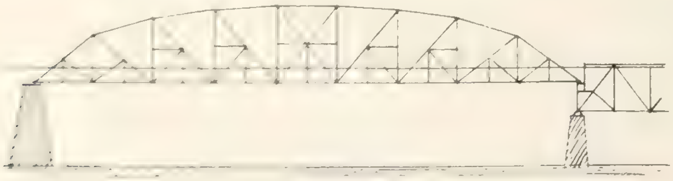
Anchorage.—The problem of holding the scow in position against the strong current (with the shores so far away) was solved by using anchorages as shown in the cut. The east anchorage was a heavy eyebeam built into the rock at the edge of the shore; the centre and west ones were composed of 15 concrete blocks weighing from three to six tons each threaded on a 1¼ ploughsteel cable with heavy double 6 in. pipe 12 in. long between each to allow the blocks to conform to the uneven bottom.

These anchors were placed about 1500 feet above the bridge. After laying, a cable was taken to the opposite pier and a heavy strain put on them to set them. The two anchors opposite the span to be floated were then made fast to a special stubbing post on a small scow. When the span was hauled across the river, the side anchor line was slacked out; the scow therefore revolved round the centre anchor and the lost distance between the main and anchor scows was taken up by the heavy purchase shown on print E. 33.

End view of span

Sliding Operation.—The bridge was hauled across by a 65 ton lidgerwood unloader, the hauling cable having a double purchase. By placing the outer sheave of the hauling cable on a girder, which practically bore against the sliding track, and the rear sheaves on a girder which thrust against the centre or main sliding shoes, which in turn were connected to the other two pair of shoes, the horizontal loads due to the frictional resistance were kept out of the distributing truss.

General.—The operation on both spans was completely successful. The anchor lines worked a little unevenly, the steel cable sticking on the stubbing post and paying out by jerks, but as there was ample provision for allowing the scow to float a certain distance down stream and haul it back, no harm except to one's nerves was experienced. Experiments as to the friction against sliding were made and gave about 13 per cent. Power to haul was provided for about 25 per cent. friction. Judging by the ease with which the Lidgerwood did its work, it looked as though 13 per cent. was about right.



Truss in position

Three hours were consumed from the time the first span was started until it landed on the centre pier, the second taking two hours and a half. The speed of travel was about 12 feet per minute, the rest of the time being taken up in adjusting the anchor scow and dismantling a part of the sliding frame to allow it to pass the hauling sheaves on the last 20 feet of travel.

Mr. James Finley, Erection Superintendent of The Dominion Bridge Co., was in charge of the work, and he was the originator of the general scheme.

Essentials of Macadam Road Building

By W. Huber, B.Sc.

ETERNAL vigilance is the price of a good permanent macadam road. No matter how much care may be exercised in building it, no matter what the quality of the material used, it can be considered at best but a temporary solution of the good roads problem if at the time of building or immediately thereafter proper provision is not made for its systematic maintenance.

The proper and most economical time to commence the maintenance of this class of road is the day it is opened for traffic. No stone used on road construction is absolutely homogeneous, no bottom is absolutely uniform in its bearing power, and, therefore, no two consecutive sections of road can be considered to have absolutely the same strength. Curious as it may seem, ordinary traffic will sometimes show up small weak spots in a road bottom over which the roller passed showing no indication of their existence, the result of which will probably be a small rut—a rut, perhaps, too small to inconvenience traffic or even to be noticeable to a person driving over it, yet large enough to collect water and soften the surrounding roadway.

System of Maintenance

Assuming that the road has been properly constructed, i.e., with well compacted sub-grade, properly under-drained, the drains running to free outlets, side-ditches carefully constructed, the road properly crowned and the metal properly bound, the idea of maintenance is to maintain these ideal conditions. As the stability of the new road is in so large a measure influenced by the facilities for drainage supplied, so will the durability of the road depend largely upon the care with which these drainage facilities are maintained. The principal work of the man on maintenance will, therefore, be to keep the drainage both above and under the road as perfect as when it was first constructed. This includes keeping the road well crowned, and sides clean and sloping to the ditches, the side-ditches open and their outlets free, drain and culvert openings clean, and ruts and depressions filled immediately they become noticeable.

The amount of work required in such maintenance will depend, of course, on several factors—quality of material used in construction, nature and amount of traffic, nature of soil, grades, climate, weather, etc.

The system of maintenance should be as simple as possible and not more than two men should be concerned in the work at any one section, viz., the road superintendent and the man actually engaged in the work. Regarding the latter, it is true, as in many other cases, that it pays to have a first-class man, even at a rate of pay higher than paid to one of mediocre ability. He must be a man who can understand the principles on which roads are built for permanency, and who can reason for himself. A man at this work will often be working for days at a time without direct supervision, and he must be a man who can be trusted to do his work and who can also be trusted to find work for himself. A man of this description will save the road superintendent many gray hairs, and will leave him time to devote to his heavier problems.

Equipment Required

The equipment required for road maintenance other than complete re-surfacing is simple—a pick, a shovel, a wheelbarrow, a fairly heavy tamping iron, and a pail being all that is required. There should also be deposited at short intervals on the road-side, small piles of crushed stone and grit. For small repairs the stone may be somewhat finer than the regulation two-inch size used in construction. From one to one and a half-inch will be found most satisfactory. The grit for repair work should be selected for its cementing quality, even more than in construction work. For this work it will be found profitable to secure and store a car of the very best grit obtainable, even at a higher price and freight rate than ordinary grit.

The length of road which one man can properly look after varies with local conditions, but ordinarily a single man can keep from four to six miles in good repair. If it is found that he cannot keep up with the work, his section should be shortened, rather than another man added, as it is found the most economical work is done by men working singly.

The best time for examining the entire length of a section is just after a rain. This will show up all ruts and other depressions, and also any obstructions or lack of grade in side ditches, drains and culverts.

The best method for filling ruts and low spots in the surface is to pick the stone loose in and for several inches around the depression, add a little fresh stone and grit, wet it, and tamp thoroughly. It may be found that traffic will disarrange the stone somewhat, but if it is gone over a few times at intervals of a day or so it will be found to have set and become an integral part of the road, and, if the work has been carefully done, indistinguishable from the remainder of the road. These small depressions should be remedied as soon as they appear, remembering that each one forms a basin for the collection and retention of water which in turn softens the road. This work all resolves itself into an attempt to keep the surface drainage perfect.

Another cause of trouble in macadam roads is the allowing of the earth sides to become cut up and become higher than the edge of the stone, thus impounding water that would otherwise run off. These earth shoulders should be kept trimmed below the level of the stone. In this connection an occasional trip over the road with a split-log or plank drag will be found economical. This will necessitate the hiring of a team for an occasional day, but the expenditure will be well justified, and it will be found that the longer this practice is continued, the less dragging will be required, as the surface of the earth shoulder will become hard, smooth and impervious to water and able to support traffic almost as well as the stone section. In fact, this part of the road, where this method has been followed, is in dry weather often preferable for driving to the macadam section.

The remaining most important part of the maintenance man's work is the keeping of all ditches and drain and culvert outlets open. This work will be heaviest in the spring and fall, when ditches tend to become clogged with leaves and other debris. During the winter special pains must be taken to keep all these watercourses in first-class working order, bearing in mind that the principal idea in winter is to have a course ready for the water as soon as the snow starts to melt. In this as in other work it is easier and cheaper to anticipate trouble than to remedy it after it occurs.

These few points, then, comprise what seem to be the essential features in Macadam Road Maintenance, and if they can be put any more briefly, may be stated as follows: start maintenance as soon as the road is built; put a good man at the work; keep both stone and earth sections smooth and properly crowned; remove every obstruction to water running off and from under the road both in summer and winter; and, lastly, and most important of all—keep eternally at it.

Huge Dam for St. Maurice, Que.

A huge dam is to be erected on the Upper St. Maurice River, P.Q., for the purpose of regulating the flow of that river for generating electricity. The Hon. S. Parent, the chairman of the Quebec Streams Commission, which will carry out the work, claims that the dam will be three times as large as that at Assouan, Egypt. He further says that its construction will be far less costly than that of the dam on the Nile, as the latter cost about twelve millions, but the Provincial Government hopes to build the one on the St. Maurice for about a million and a quarter. There is a good rock foundation at La Loutre, the place where the dam will be erected.

According to Mr. Parent, the work will be rushed, but it will first be necessary to make an inventory of the different water-powers on the St. Maurice basin, and to get plans and specifications from the foremost engineers. He is of opinion that tenders will be called for in the spring and that work will be begun next summer. He thinks that the contractors will probably take three summers to complete the work, though they may do it in two if they rush the operations and work night and day. The area of the proposed reservoir will be more than 300 square miles, and the amount of water to be stored will be about 160 billion cubic feet. It will drain a basin of more than sixteen thousand square miles in area, and give a regular flow of 18,000 cubic feet per second in Shawinigan and other places. It is calculated that it will bring in $100,000 in the first year.

C. N. R. Bridge Work

Four large bridges are being constructed between Montreal and Pembroke by the Canadian Northern Railway, at a cost of a million and a quarter dollars. They are being built over the rivers Laprairie or Back River, the Mille Iles, and the Ottawa at Shaw Falls, and at Portage du Fort. All the sub-structures are of concrete, while the super-structures will be of steel supplied by the Dominion Bridge Company at Lachine, and which will be placed in position during the coming summer. No. 1, which crosses the Back River near St. Genevieve, has eight spans,—and is about 1,400 feet in length, while No. 2 has thirteen spans in all and strikes the Mille Iles after crossing the upper end of the Jesu, which at this point is about one and a half miles wide. The structure at Shaw Falls will be 1,800 feet in length, and that at Portage du Fort some 1,300 feet.

Concrete Grain Elevator Construction

Moving Bin Forms Used First at Port Arthur—Methods of Jacking — Factors Influencing Speed of Work

By R. P. Durham.[*]

THERE is nothing in connection with the construction of foundations and first storey of a concrete grain elevator, and very little in the construction of the cupola, calling for special comment as to method of procedure. Aside from the fact that foundation loads are exceedingly heavy and the item of the complicated construction sometimes necessary in the cupola, the ordinary methods of concrete warehouse construction are in general followed in building such portions of grain elevators. The building of the bin walls has, however, developed a method of construction not used, as far as I am aware, in connection with other buildings. This arises from the great height of bin wall of the same thickness, which early suggested that a short form which could be moved up continuously would be the most economical design.

General Design

All moving bin forms have certain characteristics in common, the variations between those used by different contractors, or by the same contractor at different times and on different work, being more in method than in principle. The form consists of horizontal framing pieces to which vertical sheeting is attached. The form may vary in height from 3 ft. to perhaps as much as 5 ft., measuring by the length of the vertical sheeting, but is always a comparatively short form. It must, of course, extend along both sides of the wall being connected by vertical timber or steel yokes which are usually attached to the horizontal framing of the form. The sheeting is generally of wood dressed on the side in contact with the concrete. Galvanized sheet steel on a wood framework has also been used, and in some cases the wood sheeting itself has been covered with steel, either on the forms for the outside walls or on all the forms. The purpose of covering the wood sheeting or lagging with sheet steel has been to make smoother walls. It has been found that the use of steel is not necessary if the raising of the form is carried on rapidly and continuously and a gang of pointers follows closely after the moving forms. In such cases the wooden sheeting has produced workmanship which is all that can be desired and in some ways is superior to that produced by stationary forms.

The principal difference in methods of building bin walls with moving forms is dependent upon the procedure followed for raising the forms. It is necessary, in order to obtain walls which are smooth and results which are economical, that the forms be raised continuously and that the movement be at a steady rate. The concrete at any particular point must have a reasonable length of time to harden before the bottom edge of the sheeting gets above it. This means that the progress in any one day is limited to a maximum of approximately twice the depth of the form, which insures that there will never be any exposed concrete which is less than 12 hours old. Assuming a 4-ft. form, this means that the movement must not exceed 4 feet in 12 hours, and it is generally less than that; so that a very slow, but at the same time a very steady upward movement is desirable. It will probably be asked, Why not build forms with longer sheeting and jack faster? The answers are, first, that it is not desirable to put a much greater load on green concrete; and second, that 6 to 8 feet of concrete a day on a large building has been found to be the maximum which can be got into the forms, when the placing of reinforcing and other items tending to delay have been considered.

Early Forms of Jack

The Canadian Pacific Elevator at Port Arthur, built in 1903, was the first elevator as far as I am aware, on which moving bin forms were used. The jacking was done by means of, I think, ordinary locomotive jack screws. Brackets were fastened to the lower horizontal members of the forms and the jacks were set on vertical posts, with the top of the jacks bearing against these brackets. As the forms were raised to the limit of each jack, another section of post was added below the jack and the entire form structure thus gradually raised from bottom to top by increasing the length of the post. The jack posts were probably of varying length so that all jacks would not have to be released simultaneously.

Another method of raising moving forms, and that used by our company at the Missouri Pacific Elevator, Kansas City, and on one or two other contracts, was somewhat similar except that the jack was placed at the bottom of the bin instead of at the top next to the form. Locomotive jack screws were placed below the posts and the entire form structure and scaffolding gradually raised, the new sections of post being put in at the bottom from time to time as the limit of travel of any jack was reached.

Screw and Pump Jacks

After this time, with the increased number of concrete elevators being constructed and the increased number of engineers working on schemes for raising the forms, the method of jacking becomes more diversified. The style of jacks may, however, be divided into two general classes, the screw jack and the pump jack. The former depends on the travel of a nut on some form of threaded rod, either in the jack or in the bin wall; the latter depends on a toggle arrangement operated by a lever with pump handle motion and working on a plain rod. Practically all builders now support the forms, not on a scaffolding between the bottom of the bin and the form, but on steel rods which are embedded in the bin wall. The jack travels upward on these rods, the jack itself generally being attached to the yoke, to the lower end of which the bin forms on either side of the wall are secured.

The question as to whether the pump jack or the screw jack is the better style is one on which experts disagree. Some who have used both kinds are very much in favor of the pump jack; others who have had experience with both kinds stick to the screw jack. We have experimented with the pump style, but have never seen fit to adopt it in actual construction work. We have used two or three different styles of screw jacks and have built about 10,000,000 bu. capacity of storage bins with the jack we are now using. In this case the vertical rod which is embedded in the wall, and on which the jack operates, is threaded the entire length with a double V-thread about 3½ pitch. The jack casting is attached to the yoke and consists of one supporting casting and a revolving casting with apertures for the jack levers. The revolving casting is set over a square nut on the threaded jack rod. As the revolving casting is turned the nut climbs the jack rod and the yoke and forms are raised. This jack enables us to make steady progress, is capable of exerting great power in case of the forms sticking, and is sufficiently fast. On two different sections of the Montreal Harbor Commissioners' elevator, each section being about 150 x 100 ft. in plan, we have run up 80 feet of bin walls in less than 14 days, or better than 6 ft. per day. This is, of course, working night and day; for if a moving form is stopped after it is once started a joint in the work is sure to show, and generally a small offset or shelf is left at the joint.

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One company uses another type of screw jack; in its case the vertical rod in the wall is a plain rod. The jack is, briefly, an extra heavy pipe about 2 ft. long and threaded on the outside. The jack rod runs through this pipe, which is provided with a clutch at the lower end. The travelling nut operates on the pipe and when the limit of travel has been reached the clutch is released, the threaded pipe run to the other end of the travel and the operation repeated. The company has secured good results with this jack. The Macdonald Engineering Company, of Chicago, on the other hand, after trying various styles of jacks, has abandoned screw jacks altogether and uses only a pump jack.

Factors Influencing Speed of Work

The rate of progress of which I have spoken is possibly only with a comparatively quick setting cement such as is used in the United States and Canada.

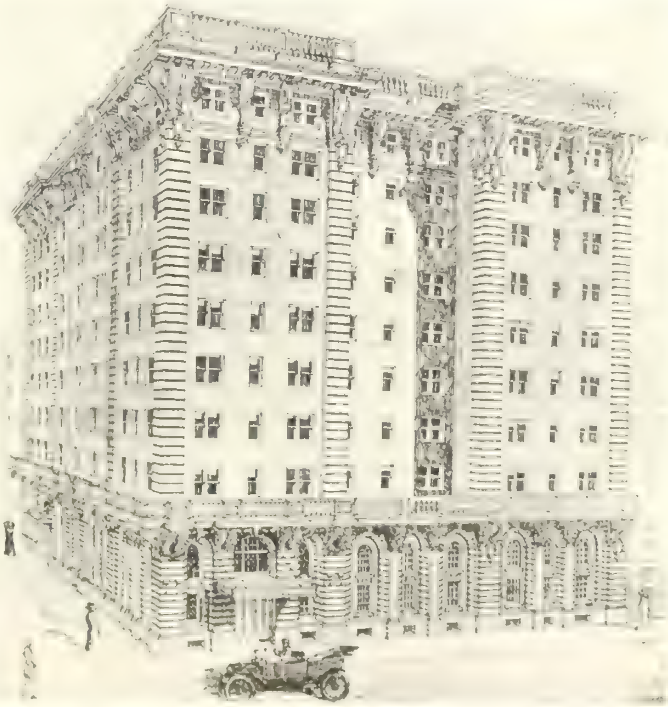
It is not possible to build a very thin wall with a moving form, the determining factor being the relation between the weight of concrete in the form and the friction of the concrete against the sides of the form. The area of form exposed to the concrete is the same no matter what the thickness of the wall, while the weight, of course, varies in direct proportion to the thickness. I think it is entirely practicable to build a 6-in. wall with moving forms, but that it is dangerous to go much below this unless very special precautions are taken to prevent lifting of the concrete. We have built concrete elevator legs 2 inches thick with moving forms and got good work, but in that case we lifted the forms with chain blocks and went with comparative slowness.

The speed of the work and the freedom from trouble will also depend somewhat on the aggregate used and, it would seem in some cases, on the cement. Three elevator builders have had trouble with one particular brand of cement in moving forms and decline to use it further. A fourth has used it with success and is not afraid of it. Whether the trouble arises from this particular cement having more properties which cause it to stick to the forms more than other cements, or whether it sets before the forms have been moved and thus causes the top of the wall to break away from the portion below it, is a question no one, not even the cement people themselves, has been able to answer satisfactorily.

The question of aggregates appears to be a comparatively unimportant one. We have had good results with crushed stone concrete and with gravel concrete. The crushed stone concrete has, perhaps, less tendency to lift in the forms, but on the other hand, on account of the likelihood of sharp corners of the stones catching in the wood of the sheeting when tamped and thus being displaced as the form is raised, smoother walls are generally obtained with gravel concrete. We have successfully run bin walls with sand and cement alone, though in general we should consider this taking a chance because of the tendency of a cement mortar to stick to forms.

Large New Hotel for Montreal

Mr. J. E. Adamson, Montreal, has prepared plans for a big hotel in that city. It will be in the up-town district, on the site at the corner of Stanley and Cypress streets, now occupied by the Stanley Street Presbyterian Church. This property has been acquired by a syndicate, who propose to construct a ten-storey hotel, on the American plan. The foundation will be of concrete, with a steel frame and exterior of brick and terra cotta.



Ten-Storey Hotel designed for the corner of Stanley and Cypress Streets, Montreal.

There will be two entrances, one on each street. These will lead to a large lobby, while on the same floor there will be a dining room, grill-room, bar, telephone room, writing room and general offices. On the first floor there will be a reception room, writing room and ladies' rooms, the remainder of the floors being devoted to bedrooms, 300 in number. In the basement there are to be a barber shop, kitchens, storage rooms, and accommodation for employees, and in the sub-basement room for coals, furnaces, etc.

Cement exports from Germany for the seven months ended July 31, 1912, were nearly 1,250,000,000 pounds, or an increase of 250,000,000 pounds over the first seven months of 1911, and an increase of 400,000,000 pounds over the same period in 1910.

The Proposed Sun Life Building, Montreal

Architects, Messrs. Darling and Pearson, Toronto

THE accompanying illustration shows the new offices of the Sun Life Assurance Company, Montreal, a section of which will be built during the present year. The site, at the corner of Dorchester street and Dominion Spuare, is one of the best in the city, and the offices, when completed at a cost of $1,350,000, exclusive of the site, will be among the finest in Montreal. The first part of the building will occupy the site on which the old Y. M. C. A. stood, and adjoining is Knox Church, which will not be vacated until four or five years from now, when the Sun Life Building will be completed. The exterior will be of the finest construction. Light will be secured on four sides, as well as from a central well. The building will have a frontage of 220 feet on Dominion Square and 144 feet on Dorchester street, and will extend to a private street that will be surveyed from the Square to Mansfield street.

Steel Column Connections in Reinforced Buildings

CONCRETE-ENCASED steel columns are now sometimes adopted in reinforced concrete buildings, instead of reinforced concrete columns. As pointed out by The Engineering Record, economy of floor space is the predominating factor in deciding on this departure. In some buildings, however, where travelling cranes are used, the vibration and large bending moments transmitted to the columns from the cranes are also important considerations.

Since this combination of steel and concrete construction is in an early stage of development, it is well for designers and contractors to realize the great importance of careful design and construction at connections of large reinforced girders with steel columns encased in concrete. In such cases, large end shears must be transmitted from girders to columns. In addition to making proper provision for these shears in the girders, careful consideration must be given to the bearing pressures on the concrete where it comes in contact with its seat in the column. Reference is made by our contemporary to a building where large angle seats are provided to assist in transferring the end shear into the column which extends above the concrete girder. Here the seat takes the form of a bracket rivetted to the column face. Designers must use stiffeners under the outstanding legs of these bracket angles to insure proper strength against bending; and a sufficient number of rivets must be employed to carry the stresses. Where the steel column stops at the bottom of the girder, it is an easy error to place a small cap on the column and assume that there is sufficient area to keep the bearing stress on the concrete within safe limits. This error should be avoided.

Briefly, this is a matter of design where every detail must be determined with care, and no guesswork is permissible. The problem is simple, but it must receive attention in every case where this combination of steel and concrete is used. In some designs, reliance may be placed to some extent on the adhesion between the concrete and steel to transmit some of the end shear; but on the whole it is much better to put all the eggs in one basket, and make the basket strong enough to hold them. Adhesion alone will not do the work. To make it available, the column must extend to the top of the girder, and this at once reduces the section effective for shear. It is possible, however, in some instances, to extend the column up into the girder by using a plate extension at the upper end of the column, thus affording an area of contact between girder and steel, through which stress may pass by adhesion. In such cases the edge of the plate should be placed perpendicularly to the plane of the girder, in order to permit the main reinforcing rod to pass. Contractors are interested in this matter because the best concrete is needed to develop proper bearing and shearing strengths; and it would be well for them to call the attention of concrete foremen to the importance of close supervision while concrete is being placed in such work as is here discussed.

Safety in Concrete Construction

"A little knowledge is a dangerous thing" is an old adage the truth of which was never better emphasized than in the present epidemic of concrete building failures, says the Engineering Record, in editorial comment upon the recent failure of a concrete theatre building at Cincinnati. Hardly a week has gone by recently without an accident of some sort, generally attended by loss of life or serious injury to workmen. While the causes are various, there is little doubt that the apparent simplicity of concrete work, both as to design and construction, has led both designers and builders to feel that the little knowledge they have is all sufficient for the construction of concrete structures. But their little knowledge is far from adequate, as is evidenced by the failures—and is dangerous, as the record shows.

The overconfidence is probably due in part to the large number of books and other publications on concrete which say but little about the precautions necessary and the conservatism desirable in such work. To the novice a concrete building is a series of slabs, beams, girders and columns, all easily figured by simple beam and column formulae. Any concrete workers' handbook gives these formulae and, in addition, tables and diagrams which resolve the simple to greater simplicity. Unfortunately a concrete structure is not an aggregation of simple members held together by some wonderful magnetic force, but has rigid connections, which introduce factors requiring consideration. Few engineers really understand the internal stresses in monolithic structures, and lamentably few designs when considered with this point in view are found adequate. One engineer who did much work in concrete in the earlier days of its rapid increase in popularity and who has maintained a conservative position as to design, has had to turn to other branches of the engineering profession because his structures were more costly than those of designers who did not appreciate the necessity for providing for the stress due to monolithic action. Failure to take into account these factors is responsible for the defects now showing up in buildings erected four and five years ago and which will soon require extensive repairs. Poor materials are shown up in a comparatively short time, but inadequacy of design is more likely to be responsible for defects which do not develop until three, four or more years after construction. . . . . It seems so simple to mix cement, sand, stone and water, and to embed it in some steel rods, that the fact that a complicated theory underlies the construction is not apt to enter the untrained mind. Consequently men who would not dare to undertake steel construction are found ready to try their hand at concrete.

To prevent disasters more stringent standards and more exhaustive investigation of submitted designs by building departments have been proposed, and while these may help, it is unwise to shift to a public authority any greater burden than necessary. Engineers can do their part by insisting upon adequate designs despite higher costs and by refusing to accept retainers to design concrete structures when the erection will not be in their charge. If an owner violates his agreement to have the engineer supervise the construction the latter can at least make plain that the owner takes on his shoulders the liability for the safety of the structure—a matter not at all trivial when a possible toll of human life is involved. Undoubtedly, too, the engineer's stand would be strengthened if courts made it clear that owners would be held criminally liable for accidents, fatal or otherwise, due to incompetence.

Furthermore, engineers should have the construction program clearly in mind in designing structures, and the design should make ample provision for the removal of the forms in the given time. The cost of the additional material required for insuring safety upon the removal of forms in seven days is more than offset by the saving in forms and by the consequent insurance against accident.

Twenty-Six Millions in Buildings at Montreal

Mr. A. Chausse, superintendent of the Montreal building department, has compiled a statement showing the value of the construction during the past year. This he puts at $26,116,958, which includes $19,141,955, the total of the permits issued by the city, comparing with $14,579,9[illegible] in 1910. There are two wards in which no permits are required, and the building there is estimated at $700,000; municipal buildings at $1,500,000, and harbor commissioners' structures, $2,250,000. The grand total does not represent the whole of the buildings in Greater Montreal, as the suburbs of Westmount, Maisonneuve, Verdun, and Outremont, which are really part of the city, are not included in the calculations.

A tabulation has been made by the Texas State Insurance Board of the origin of all fires reported to it. The tabulation now covers 20,000 fires. The fires in dwellings, apartments, boarding houses and the like number 8,954, and of these 82.4 per cent. are scheduled by the board as due to preventable causes. Exposures lead the list with 16.2 per cent.; flues with 16.1; stoves and heating with 10.5; and sparks on roof with 5.1 per cent.

Steel in Building Construction

By R. J. Grant,[*] Vancouver

An engineer who was to present a paper on "Steel in Public Building Construction," before a society in Philadelphia, was told when he arrived at the society rooms that some of the members expected him to speak on "Graft in Connection with Public Buildings." In introducing his subject, he mentioned this mistake, and made some of those present indignant by saying that he could tell them nothing about that kind of steel.

The commercial term "steel" includes widely different materials, as every demand for new properties has been met by a new product, and these have been produced in such rapid succession that the last few years in the history of metallurgy read like a fairy tale. Many of these products, as the alloy steels for automobiles, are of greatest interest, but none have been of greater value to mankind than structural steel. As adopted by the best authorities, structural steel for buildings is a low carbon product. This is not injured as much by the punching and shearing required for fabrication as a high carbon steel.

Only two things are necessary in the design of steel structures. The first is to properly design the steel for the work it has to do; the second is to properly design the steel so that the necessary work can be done in fabrication and erection, and that at a minimum cost.

Beam the First Unit in Design

The first unit to be considered in a design is the beam. Where the load is a uniform one, the handbooks published by the different steel companies give the size required. These tables assume that the top flange of beams, and that both the top and bottom flanges of channels, are supported latterly. If this is not the case the value should be reduced, as for long and slender columns. Care should be taken to select a beam of sufficient depth to avoid excessive deflection. If the span is unusually short the beam may be weak, due to excessive horizontal shear. This is more apt to be the case with the light, wide-flanged beams placed on the market the last few years, than with the old standard sections. If the beam rests on a bracket or wall plate, a section with a thicker web may be required to prevent the web buckling over the support.

When the span is short, a beam is apt to receive its greatest stress from the concentrated loads, such as safes, usually found in an office building. Where square panels are used, one-quarter of the load of a panel is carried to each beam, but it is not applied uniformly, but increases from the support to the centre. If considered as a uniform load the beam would be 35 per cent. light. In rectangular panels with intermediate beams, it is usually economy to use three beams per panel, as this reduces the size of the girders. For rolled beams the shop work usually is a very small item. Sometimes the cost is unnecessarily increased by using more than one size of holes in the same beam, which means that the beam must be handled twice.

Defects in Timber Design

Although it is a departure from my subject, I wish to call attention to faults often found in timber designs. Douglas fir is strong in resisting tensile, and compressive stresses applied with the grain, but is weak in its resistance to crushing across the grain, and to shearing with the grain. Timber beams, although of sufficient strength to resist the bending stresses, are often dangerously weak, due to the excessive horizontal shear. They should not be of greater depth than about one-tenth of the span unless this horizontal shear has been considered. Beams should have sufficient bearing area to prevent crushing the fibres. I have seen columns on which beams rested directly cut nearly two inches into the beam before the load was reduced to a point of safety. Using a fir corbel with the grain horizontal, does not help, as the crushing is simply transferred to the bottom of the corbel.

Timber trusses are often very weak on account of the difficulty of transferring the stresses from the diagonals to the chords. Bolts bearing on the side grain of timbers are of very little value as they soon crush into the fibre of the wood.

Built girders should be used instead of the heavier sections of beams. Part of the strength of steel shapes depends on the work done on the material in rolling. With angles and plates, this work is uniform throughout the whole section, but with beams the web is practically the only part of the section on which work is really done; the flange is produced by crowding the metal in the flange grooves of the rolls. This is only partly overcome by the new Grey roll, which does some work on the top and bottom of the beam. Tests made of pieces cut from the web and flange of the same beam show that the metal of the web is considerably stronger than that of the flange. Internal stresses set up in the beam while cooling, due to the different thickness of metal in web and flange, also tend to reduce the theoretical strength of the beam. This is particularly the case with large and heavy beams. The built girder being composed of plates and angles is a more reliable product.

It is necessary in considering the design of a girder to have the different parts so proportioned that they will act as one piece. To accomplish this, it is necessary to have a sufficient number of rivets connecting the flange and web angles to properly transfer the increment of flange stress from the material forming the flanges to the web. It is not sufficient to develop the full flange area between the end and centre of the girder, as the amount of stress transferred is not uniform throughout this distance, for even with a uniformly loaded girder seventy-four per cent. of the flange area is required before reaching the quarter points.

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A few years ago I had to revise a design for a building having some girders at 40-ft. span, carrying a uniform load of about sixty-eight hundred pounds per foot of span. They consisted of the section shown in figure No. 1, having web 36-in. x 7-16 in. and LS 5 x 3½ x 5/8 in. with four cover plates 12 in. x ½ in. top and bottom. The flanges were sufficient to carry all the bending stresses and the web was heavier than was required for the shearing stresses but it was not possible to get a sufficient number of rivets through the vertical legs of the angles and the web to develop the proportion of flange required in the first six to ten feet of the girder. The trouble was overcome by using 14 in. cover plates and 6 x 6 in. Ls. allowing two rows of rivets through the vertical leg. The increase in the weight of the girders was less than one per cent.

Some time ago I had to revise a design made by a firm of engineers from the United States, of a steel frame for a building in Canada. The change in column spacing above the ground floor tier in the front of the building necessitated large girders at the second floor. These girders were the best example of faulty design I have ever seen. Figure No. 2 shows a section at the point of maximum moment. The columns supported by, and supporting these girders were built H sections with the webs parallel to the girder webs. The maximum width of cover plates on the columns was 14 in., which brought the stiffeners used on the girder to transfer the load to the webs, mainly outside the load they were supposed to carry. At one end the girders were to frame into the columns, but with the sections used it was impossible to get a satisfactory or efficient connection.

Although the girders had a span of about 30 ft., the point of maximum moment was only 7 ft. from one support, on account of the 4 in. leg of the 6 x 4 in. L being vertical it was only possible to use sufficient rivets through the angles and the webs to develop two-thirds of the flange area. Neither was it possible to develop the cover plates in the space allowed. One web and one pair of angles of these girders were made continuous over the four points of support, the eccentricity thus introduced gave excessive stresses in one half of the girders, and also in the centre supporting columns.

I could not get the man who designed this work to give any good reason why he had used a box girder in this place, and I am certain no one else could. Every condition called for a girder with a single web. It meant a saving in material of over 1,000 each, 30 per cent. work less in fabrication, and efficient details and connections. Of course it was necessary to use flange angles with 6-in. vertical legs in order to have sufficient rivets to develop the flange.

In designing plate girders, it is not always sufficient to have enough area in the web to take care of the shearing stresses. This is apt to give too thin a web, particularly for long, deep girders. The web should be thick enough to give the necessary bearing area for the flange rivets, and for good design it should not be less than 1/160 in depth. Sometimes it is economy to use a web of greater thickness, and so avoid the need of stiffening, which reduces the work required to fabricate, but usually increases the weight. When it is necessary to splice the web of a girder wide plates should be rivetted on each side, and enough rivets used to develop the strength of the web plate in bending. The top flange of a girder should be supported laterally to prevent the tendency to buckle; which gives an increased stress in certain portions of the material. It is sometimes economy to use large angles and no cover plates, as the saving in cost of fabrication may more than offset the extra material required. Wide plates are not always true to width or the edges perfectly straight. This sometimes means expensive chipping of the webs of plate girders where the depth back to back of flange angles has not been made greater than the width of the web plate. It is best to allow from one-quarter to one-half inch in this distance.

Holes of different size in the same piece of material always mean increased cost, and the larger the piece the greater this increase will be. I know of the steel for a building that was designed by an engineer who was unacquainted with the methods of handling material in the shops. In some large box girders he had called for open holes through the webs for tying in fireproofing, to be 5/8 in. The rivets were all 3/4 in., requiring 13/16 in. holes. In estimating on this work the company that secured the contract added 5 cents per 100 lbs. for the increased cost of handling due to these holes being of different sizes, which amounted to about $800. Before proceeding with the work the company's engineer asked permission to make these holes all 13/16 in. As it did not in any way influence the strength, the permission was readily granted, but the owner did not get the $800.

Column Weakest Link

The weakest link in modern high building construction is the column. In beams and girders the factor of uncertainty usually increases the factor of safety. The continuous action at supports and the arch action tend to reduce the stresses in the floor members. These actions in the floor members only make conditions worse for the column by changing the distribution of load between the columns, and introducing a certain amount of bending. The greatest source of weakness in columns is the eccentric applications of the load. This should always be considered and provided for, but it is not always done even in steel designs, while with reinforced concrete it is usually neglected.

One man who had designed considerable reinforced concrete work told me that he considered there were no eccentric stresses in reinforced concrete columns, and to prove his statement gave the example of one of a row of columns being destroyed by a derailed car, and the upper portion of the column hanging suspended from the roof until wooden supports were put into place. Of course, like "The Flowers that Bloom in the Spring," it has nothing to do with the case. Any column on which the loads are not symmetrically applied, has to withstand the bending stresses due to this eccentricity.

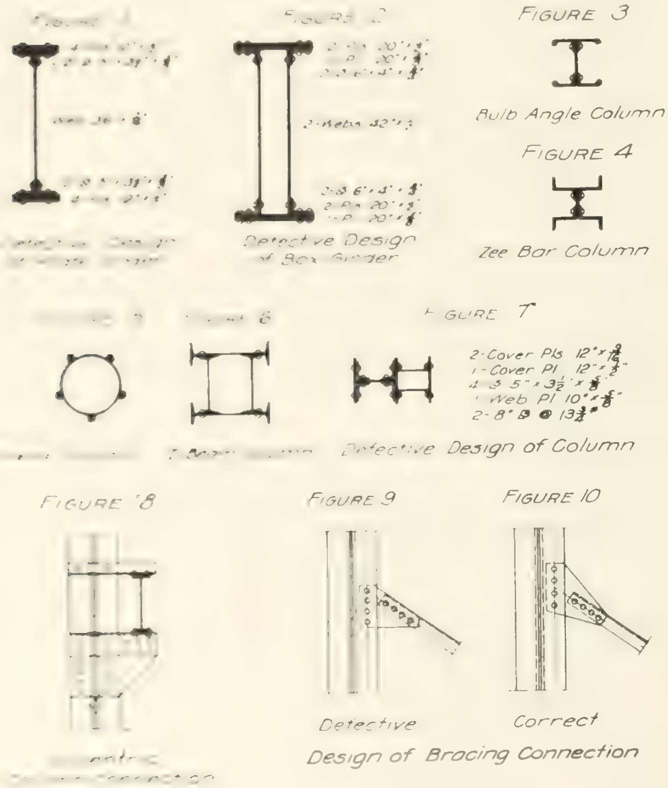
For very high buildings, or where the loads are very great, the box column composed of two channels and two or more cover plates, or four angles, and four or more cover plates, is the most economical section, for most buildings up to twelve or fourteen storeys, the H section composed of plates and angles is the best to adopt. The rolled H section is sometimes used, but although sometimes cheaper, the material is not as good as in the built member. Sometimes in H columns bulb angles are used as shown in Figure 3, but unless the quantity is unusually large, the saving in material does not make up for the increased cost per pound. Where the load is small and the column long it is sometimes best to use a section composed of four angles and lattice bars in one plane, giving the shape of an H section. For extreme lengths, four angles and lattice bars in four planes, giving the open box section, is the most economical.

For some years the Zee Bar column as shown in Figure 4, was much used, but although an efficient section, the cost of fabrication is high on account of the [illegible]

[illegible] flat in one operation as they can an angle. [illegible] for [illegible] and girders are also more expensive [illegible] H column, so that of late years it has had a very small place in building construction.

A column section which was very popular for both bridges and buildings from twenty to thirty years ago was the Phoenix column, shown in Figure 5. It was an efficient section, but it was impossible to get good connections for the floor members and bracing at reasonable cost. Being the product of only one rolling mill, the lack of competition in the price limited its use, so that to-day it is practically not on the market.

Other columns of special sections have been used to a small extent, but the tendency has been to eliminate all but the standard sections and simple forms. This has been largely due to the reduction in the price of steel and the increase in the cost of labor used in fabrication. The standard shapes, particularly the plates and angles, can be obtained with less delay from the rolling mills, and time of delivery is often a most important factor in building construction. The use of standard shapes does not necessarily mean same column design. Figure 7 shows a column designed for the first tier of a twelve-storey building. The H portion of the column continued up to the second tier, and at the second floor, a large box girder rested on the channel portion of the column. The width of the box girder was 20 in., which brought the stiffener angles of the girder outside the metal in the columns section. The centre of gravity of the loads came about 3 in. from the centre of gravity of the column. When the designer was told that this introduced a high stress in the column due to bending, he said the stiffness of the girder would take care of that, entirely neglecting the fact that the column was there to carry the girder, not the girder the column. The bending of the girder due to its load tended to bend the column in the same direction as the eccentricity of the load in the column itself, so that the stresses in both the girder and column were increased.



Steel in Building Construction

The main objection to sections of this description is the increase in the cost due to the extra labor required to punch the material and rivet up the section. The cost of the cast iron base required to distribute the column load over the masonry footing is also unnecessarily high.

The connections of the floor beams and girders to the columns should receive careful consideration, as the stiffness of the building, if less than about fifteen storeys, usually depends mainly upon these connections, many building specifications call for the connection between beams and columns being made by means of angles rivetted on each side of the web of the beam in the shop, and then field rivetted to the column. This is the method always adopted when one beam frames into another, and for this case the connection angles have been standardized so that the shop cost is small. For all cases it is the lightest efficient connection for the beam.

When the beam frames into a column it is not always possible to see the standard connection angles, on account of the spacing of the rivet holes in the outstanding legs of the angles not being the same as required to fit the section of the column. As the column sections change for different tiers, these angles would change, making beams which would otherwise be alike, different. And the way to get cheap steel work is to make not only the section, but also the details so as to allow as great a duplication as possible.

The column bracket has been produced to give economy in spite of using a greater weight of material. It gives a considerable reduction in the cost of erection as it greatly reduces the number of field rivets and erection bolts required. It reduces the amount of shop work required on the beams and allows for greater duplication. Column brackets for the smaller beams consist of a single angle rivetted to the face of the column, but for the larger beams one or two stiffener angles are fitted to the under side of the seat angle, with the outstanding legs under the web of the beam.

For all beams resting on column brackets, top angles must be provided, tying the top flange into the column. As these top angles are usually shipped loose, or only bolted to the column they are sometimes misplaced or lost, the inspector should see that they are replaced and rivetted before he passes the work, as they are very necessary for the stiffness of the building.

When the centre line of the beam does not coincide with the axis of the column, the eccentric connection required should be carefully figured. Figure 8 shows a typical bracket for a spandrel beam, placed twelve inches off the centre line of the column. If the load on this bracket was centrally applied, the bracket would be good for sixty-three thousand pounds, but with 12-inches eccentricity it is only good for twenty-one thousand pounds; or only thirty-three per cent. of the value of the rivets being required for the vertical component or the direct load, the balance resisting the torsional component due to the eccentricity. These connections should all be figured from the polar moment of inertia of the rivet group. This connection is for a beam not over twelve inches deep. For a large beam, stiffener angles would have to be used under the beam.

Sometimes these eccentric connections are left for the company furnishing the steel, to design. This should not be, for often the detail is determined by nothing but a guess, and as the guess is usually made by an inexperienced draughtsman, the result is apt to be a weak spot in the frame work.

When it is necessary to splice a very light column, it is best to use sufficient rivets to take care of the whole load, as this saves the expense of milling or planing the ends. For heavy columns it is best to mill the ends to give a true bearing of the different pieces, and use splice plates with only sufficient rivets to take care of the bending and hold the members true to line. If the metal in the one section does not come directly over that in the other, it is necessary to use a bearing plate between the sections. All the pieces forming the section of a column should be the same length, or it will not be possible to mill the ends after the member is assembled.

I have seen building columns composed of four I-beams arranged in the shape of a box with the flanges of two of the beams projecting, as shown in Fig. 6. This is the poorest column section I have ever seen. I can imagine no other excuse for using it than the possession of the material for which one could find no other use. In place of milling the ends of this section so as to transfer the stress from tier to tier, the outer beams were cut back a couple of feet so as to form a lap joint, and splice plates rivetted to the lower section. This gave a very difficult and expensive piece of erection, and when erected the two halves of the section did not come to a true bearing, but in places sheet metal was driven in between the two surfaces. The ends of the different pieces forming the section, had been milled or finished before the columns were assembled, but this is practically of no value. To be effective for end bearing, the milling must be done after the section is assembled, and rivetted together, and this can only be done when the ends are on one plane, and this plane must be perpendicular to the axis of the member.

Influence of Wind Forces

The influence of the wind forces should be considered in column design, but it is not often necessary to increase the sections above those required for the dead and live load stresses, unless the building is very narrow or over twelve storeys high, unless it be in the first or ground floor tier, when it is usually better to add the necessary material to the column rather than use brackets or kneebraces, which would interfere with the architectural treatment. Where special wind bracing is necessary, there are two methods that can be adopted, either of which will give the necessary stiffness. The most direct means is by the use of diagonal bracing such as used for the Singer Tower, New York City. In this case, each of the four corner panels is braced on all four sides. The bracing is arranged in alternate panels of shallow and deep diagonals so as to allow for windows and doors, diagonals are also used on the closed faces of the elevator shafts. One of the reasons why this was an economical arrangement for this building was that the panels were very small, being only twelve feet square. The tower is 60 feet square, so that large window openings are obtained in the three centre 12-foot bays.

The most common method of stiffening a building to take care of the wind forces is by means of horizontal wind girders, and brackets or kneebraces. Unless the kneebraces are run up half the storey height, this method gives bending stresses in the columns, but for buildings of ordinary height this bending can easily be taken care of. This method was adopted for the Metropolitan Life Building, New York City, the tower of which, 75 by 85 feet, is 48 storeys high. The exterior faces alone are braced, at the corner columns with kneebraces half a storey high, at the centre columns with brackets having solid webs 8 feet 6 inches deep, including the wind girder. As the panel lengths were very long, this was the best system to adopt. In the Woolworth Building, the steel work for which has just been completed, there is a tower about 85 feet square, and 55 storeys high. For bracing they have used different systems for different floors, and different faces, using diagonal or X bracing brackets, kneebraces or curved plate girder portal bracing, depending upon which best suited the architectural features. The curved plate girder portal bracing is usually too expensive to receive much consideration. For mill buildings and similar structures where a wide open space is obtained by using steel columns and trusses, the wind forces are usually taken care of by kneebraces and bending in the columns. For an armory or rink roof, where the span is great, and the appearance is a consideration, it is best to use a steel arch and carry the wind forces directly to the foundation by means of the arch truss.

The efficiency of kneebraces and diagonal bracing is sometimes very low on account of poor connections. Fig. 9 shows the way in which this connection should not be made. Detail should be made as shown in Fig. 10, where the centre line of rivets connecting the bracing angle and the gusset plate intersects the centre of gravity of the group of rivets resisiting the action of the angle. A single angle, if connected by only one leg, as shown in Figs. 9 and 10, has only that leg available for resisting tensile stresses. A clip angle must be used connecting the outstanding leg to the gusset plate if the whole net area is required.

Trusses and Web Members

Where it is desirable to obtain a clear open space on one of the lower storeys of a high building, where the width is fifty feet or greater, it is often best to use trusses the depth of one floor, rather than shallow plate girders. The deflection is less, and the web members can be so arranged as to leave good openings for doors and corridors. The trusses are lighter and very much easier to handle and erect, than the heavy girders usually required.

In the design of trusses for buildings, it is usually necessary to proportion the chords for the load from the floor, carried between panel points as well as the direct stress of compression or tension. If the outline of the truss is not the proper one for the location, the area required to resist the secondary stresses may be larger than that required for the direct load. The top chord of the truss usually consists of two channels and a cover plate, the lower side being latticed. The channels should always be turned with the flanges outstanding, as the cost of driving the rivets connecting the channels and cover plate is excessive if the flanges are turned in.

The web members should be made as narrow as possible in order not to use up too much of the floor space with the partitions, but it is absolutely necessary to fireproof every member of the trusses. Very close inspection of the work in the field is required for trusses. The inspector must see that milled ends come to true bearing, and that all rivets are properly driven so as to fill the holes and grip the pieces connected, firmly together.

During the erection of the steel frame, it is important to see that everything is plumb before the riveting of the beams, girders and columns splices is done. The neglect of this point even in a couple of tiers may lead to trouble in the elevator shafts. Before allowing any of the steel work to be covered, the inspector should see that all rivets are driven. Loose rivets are of no value and should be cut out and re-driven. If a rivet cannot be driven, a bolt should be substituted, having a perfect driving fit in a reamed hole. If the building is going to be a fireproof one, careful attention should be given to this point, particularly for the columns. To wrap the column with wire mesh or expanded metal and incase in concrete, is the best method. The floor space taken up by the fireproofing is a minimum, and the fireproofing besides being able to withstand the action of fire, is able to resist a strong stream of water, such as is thrown by the high pressure systems which some cities are apt to install.

Plaster block [illegible] a large portion of the floor space, and it is not practicable to so anchor it to the column, thus exposing the column to the heat of a fire with the chance of the destruction of the whole building. For columns it is best to use a cast iron base, or if the load is large, cast steel may be cheaper. These should be designed for the loads they have to carry, and a factor of [illegible] to allow for the defects which are always present in cast material. The design should be such that with the necessary strength the pattern is a simple one, and not difficult to cast in the foundry. Duplication is one of the greatest factors in reducing the cost of castings.

For high buildings not built on a rock, the most important point is the foundation. It is not alone the safe bearing capacity of the material which has to be considered, but it is necessary to have the load per square foot uniform, so that the settlement which is always present may be the same for all columns.

The bearing capacity of the soil should be reduced to the dead load equivalent for the columns having the largest proportion of live load to dead load, and all footings should be proportioned for the dead load only, at this value. If the footings are not properly proportioned, cracks are very apt to occur due to unequal settlement.

Structural Steel Poles and Towers

In a paper presented by Mr. R. Fleming, of the New York office of the American Bridge Company, before the Convention of the Association of Iron and Steel Structural Engineers held at Milwaukee, a careful discussion is given to computations, design and correct practice in the construction of structural steel supports for overhead wires for the transmission of electrical power.

The author states that nearly four million wooden poles, about twenty-one per cent. of which received preservative treatment, were purchased in 1910, and about the same number in 1909, at an average first cost of $1.89 each. In general this low cost does not at present warrant the use of steel poles on the score of economy alone, but for heavy duty, long spans, and difficult foundations, and the elimination of fire risk, substitutes for wood are sometimes necessary. There appears to be a tendency to increased use of reinforced concrete poles, and iron pipe poles show good results for light loads. There is not yet any recognized standard of structural steel poles or towers, but latticed poles are most favored.

Stresses in Towers

Poles or towers should be designed for vertical or dead loads; loads at right angles to the direction of the line, due to the lateral wind pressures, and unbalanced loading in the direction of the line due to breaking of wires. The vertical loads are the weight of the structure itself, the weight of wires supported by it, and the weight of snow or ice coating on the wires. Ice is generally assumed to accumulate one-half inch thick around the wires, and the cross-arms should be designed for a minimum load of 1,000 lb. each at each end to provide for insulators, wires and workmen. Wind pressure should be assumed at 30 lb. per square foot on the exposed surface of the structure, and 15 lb. on the bare wires, and at 10 lb. on the wires covered with one-half inch of ice.

For unbalanced loading it should be assumed that a tower having three-line conductors should be designed to withstand the unbalanced load due to any single wire breakage. A tower having six-line coductors should be designed to withstand the unbalanced load due to any two wires breaking. In computing these stresses it is recommended that the breaking loads of the wires should be assumed to be, for No. 4 and under, the ultimate strength of the wire; for No. 3, 90 per cent. of the ultimate strength; for No. 2, 80 per cent.; No. 1, 70 per cent.; No. 1/0, 60 per cent., and for No. 2/0, 50 per cent. Hard-drawn copper wire is generally used with an elastic limit of 34,500 lb. or more, and a tensile strength of 50,000 to 65,000 lb. per square inch.

Unit stresses should be assumed in accordance with the classification of towers into three types, A, B, and C. Class A is for towers where the importance of uninterrupted service is very great or where great danger might arise from accidents to the towers or wires. Class B is for towers on lines where certain interruptions of service may be permissible, and class C is for towers where accidents would be less likely to endanger life. For ordinary structural steel the working unit stress may be taken at 22,500 lb. for class A, and 27,000 lb. for class B. In compression the formula

$$22{,}500 \text{ or } 27{,}000 \div [1 + (l^2/18{,}000\, r^2)]$$

is recommended.

The design of towers and poles should not be governed exclusively by the requirements of artificial tests, but great consideration should be given to durability and conditions regarding thickness of material, ratio of un-supported lengths of columns to radius of gyration, and details should be imposed. A greater value may be placed upon tests of poles composed of two pieces and simple construction than on tests of poles built up of many pieces or of complicated structure.

Both horizontal and vertical angles in the line should be considered in designing the poles or towers. It is often assumed that the standard towers are good for horizontal angles up to 10 deg. without special provision. The most satisfactory practice is to use a tower calculated to withstand the increased loads due to deviation in the direction of the line.

General Considerations in Design

In the flexible tower system about every tenth tower is made perfectly rigid to take longitudinal stresses, and the intervening towers are made to withstand only the dead weight and transverse wind load. If a wire breaks there is a drop in the catenary and the shock is absorbed into the series of poles by each yielding at the top. The fixed tower, being designed for all wires breaking, prevents the longitudinal pull from extending beyond it. The intermediate towers are generally A-shape, and are made of two channels latticed with angles. In this system, if a wire breaks the unbalanced loading may be taken up by greater sag and less tension in the cables, thus necessitating higher towers to maintain the required clearance under the wires. For low voltages, for towers or poles comparatively close together, they may be sometimes used to advantage. Where high voltages are used with only eight or ten towers to the mile, rigid towers should be used. A municipal line 2 miles long, from Winnipeg to Pointe du Bois, has rigid towers 1,200 feet apart with a flexible tower midway between. They are 43 feet high to the cross-arms and carry six wires.

Anchorages of towers should not be designed without consideration of local conditions. A common anchorage consists of a vertical angle extending 5 to 8 feet in the ground, with a cross-piece 3 or 4 feet long at the foot and having the upper end bolted to a corner leg at the tower. Such an anchorage should extend not less than a foot above the ground and should be entirely enclosed in concrete. Thicker steel sections will delay, but not prevent, failure from corrosion.

Steel only one-eighth of an inch thick is in common use for towers, and such material, galvanized at the shop and bolted together in the field, and then neglected, cannot last for a long term of years. The use of unusually thin metal for compression values calculated in accordance with accepted formulas, is to be criticized. There is no reason why a tower, properly designed, inspected at regular intervals, painted when necessary, should not last fifty years, perhaps longer.

Good progress is being made on the new brick plant, which is being erected at Cooksville, Ont. There are now about 140 men and 35 or 40 teams of horses working, while a large steam shovel is operating. The Canadian Pacific Railway is making a large siding in the plant.

New Church for Vancouver in the Byzantine Style of Architecture

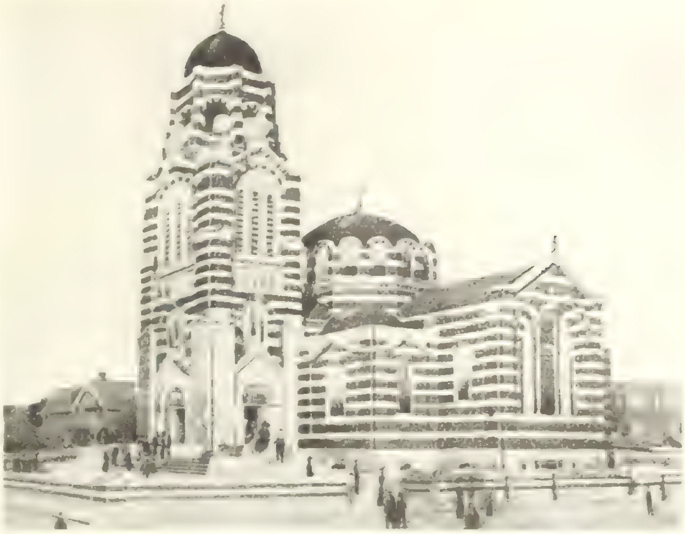
The proposed Greek Orthodox Church shown in the accompanying illustrations, which will fill a long-felt necessity in Vancouver, is to be erected in the immediate future for the accommodation of a large and increasing body. The architects for the new edifice are Messrs. Bryan & Gillam, of Vancouver, who are instructed to design a building in the Byzantine style of architecture, which is so closely identified with the traditions of the Greek Church.

The most noted examples of ancient Byzantine architecture are to be found in south-eastern Europe, perhaps the most noted being the Mosque of St. Sophia, in Constantinople, once a Christian cathedral but now a Moslem Mosque.

Modern ecclesiastical buildings in the Byzantine style are extremely rare, the most noted and beautiful example being the new R. C. Cathedral at Westminster in London, Eng., designed by the late John Francis Bentley, who died without seeing his masterpiece completed.

This new Orthodox church will be unique among Vancouver's many handsome and ever-increasing churches, and although ancient in design, will be most modern in construction, reinforced concrete entering largely into the construction of the piers and pentatives supporting the domes.

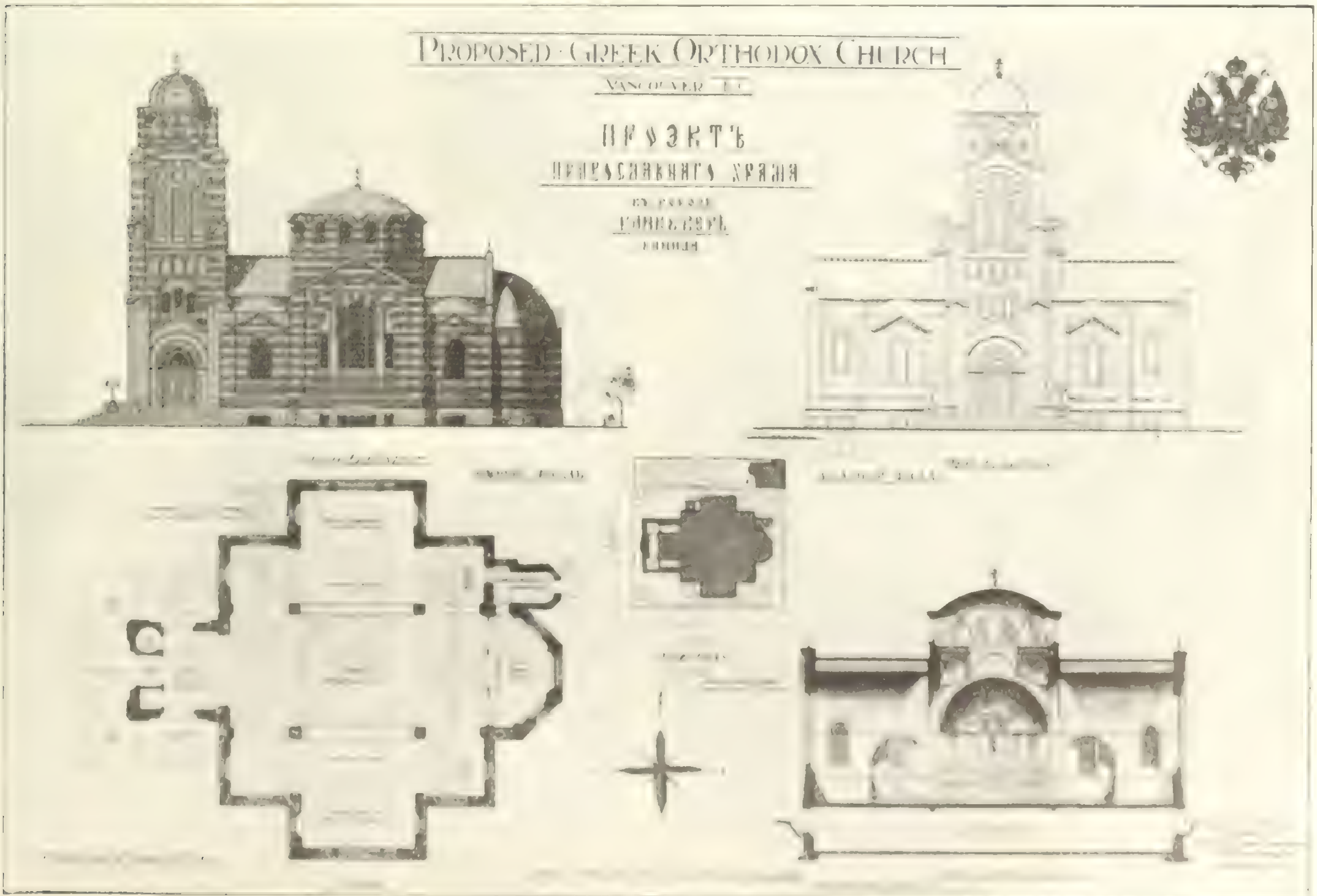
The interior will be treated in entire harmony with the Byzantine style. The nave and transepts will be barrel-vaulted, merging into the arches supporting the central dome, while the sanctuary will be paved in marble mosaic and the walls panelled in richly colored marbles. The rood screen crossing the chancel will be richly decorated, while the eastern windows above the altar will be of colored stained glass. This, with the scheme of upper lighting from the clere-storey windows below the central dome, will greatly enhance the feeling of spaciousness and impressiveness within the church, thereby giving full effect to the dignity and grandeur of the Greek ritual.



Proposed Greek Orthodox Church, Vancouver.

The exterior facings of the walls will be in red brick and white stone, and will be treated in the simple manner characteristic of the Byzantine style, while the graceful proportions of the tower crowned with its copper dome will make it a landmark in Vancouver, and the effect of the salt sea breezes will tone all the copper domes to that indescribable green color so admired by the artistic temperament. The roof will be of slate.

Ample provision is made in the lower ground floor for the Sunday School, church offices, heating plant, etc. Adjoining the church will be a residence for the officiating priest.



Unprecedented Activity at Winnipeg

Favorable Climatic Conditions Assist in Making New Records for Winter Work — Noteworthy System of Street Lighting

Correspondence of the Contract Record

Winnipeg, January 4, 1913.

THE exceptionally mild weather of the past two months has enabled building operations to be continued to an unprecedented extent. All of the larger buildings are closed in and the interior work is being rushed to speedy completion.

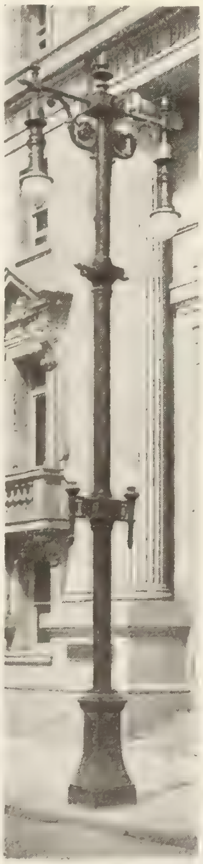
Of particular note in the matter of rapidity of construction is the Winnipeg Electric Company's building. Although this is one of the largest office buildings in the city, it was well on in the summer before ground was broken for the foundations, and at the present time the exterior work is completed, making a record, for this city at least, for a work of this magnitude. The building is of the structural steel frame type and the exterior is finished in dark grey terra cotta, which gives the appearance of cut stone. This results in giving an ornamental and solid appearance to the exterior of the building.

The city has added a great deal to the appearance of the streets in the down-town district by the erection of ornamental iron standards for street lighting. Fig. 1 shows the type of 2-lamp standard which has been adopted for the main business streets. The lamps themselves are the 6.6 ampere luminous magnetite arc lamps supplied by the Canadian General Electric Company. These lamps are operated with direct current supplied from mercury rectifier sets installed in the May street sub-station of the city. The two globes seen on the lower cross arms are for tungsten lamps to be used in connection with the signal system of the police patrol and fire alarm. Of these standards there were erected this year on Main street 63, on Portage avenue, 21, and on William ave., Market and Princess streets a total of 16. The lamps are fed from underground wherever there is conduit and in the other places the overhead wire is carried on the standard.

The boulevard type of standard is used on residential streets as well as on cross streets in the business district such as Smith. These standards are 14 feet high and where the streets are treed they are erected on the boulevard on the road side of the trees. The same magnetite arc lamp is used on these standards as on the large two-lamp standards. On Assiniboine avenue the lamps are placed approximately 160 feet apart on the same side of the street, the lamps being staggered so that the distance measured parallel to the street, between two lamps on opposite sides is only 80 feet. The effect of this spacing is to produce an illumination so great that one could easily read a paper in any part of the street. The number of these standards erected is as follows: Assiniboine ave., thirty-two; Carlton and Edmonton streets, eight each, and Donald and Smith, six each. Eighteen more will be erected on Carlton street immediately.

The city has also made considerable progress this year

New office building of the Winnipeg Electric Railway which will be completed early next Spring



2-lamp standard, Winnipeg lighting system

Method of erecting festoons adopted at a recent celebration in the extension of its underground conduit system for the distribution of electrical energy by the Light and Power Department.

On Portage avenue the system has been extended during 1912 from Carlton to Colony street, 30 way duct having been laid on both sides of the street. On James street a 12-way duct line was constructed from King street to the high pressure pumping plant at the east end of James street. A 12-way run was constructed from the May street lighting substation to connect with the Main street line at the corner of Main and Henry.

All of the 2-way runs are for street lighting only, the boulevard lamps described above being fed from these runs. The domestic lighting is done in this district by overhead wires carried on poles erected in the lanes.

Progress at Vancouver and the Coast

No Let-up in Building Operations—Many Large Structures Nearing Completion and Others Contemplated—The University Competition

Office of The Contract Record,
Vancouver, Jan. 1, 1913.

In spite of the adverse weather conditions experienced at Vancouver during almost the entire month of December, building construction throughout the city and suburban districts progressed at much the usual rate. Noticeable headway was made on all the larger buildings in the business sections, and it is safe to state, that most of these structures will be completed within contract time. The excavation for several substantial office and apartment blocks has been commenced, and actual construction will proceed without delay. The leading architectural firms report a large amount of business on hand. Plans of several important business blocks are in course of preparation both at Vancouver and Victoria, and the volume of building construction projected for the balance of the winter, in both cities, is expected to reach a total greater than for the same period in any previous year.

From an architectural standpoint the new university of British Columbia takes first place in the list of important projects upon which early construction is planned. Other large contracts on which work will be rushed during 1913 are: The reconstruction of the Hotel Vancouver at a cost of $2,000,000, the new Hudson's Bay Building, involving an expenditure of $1,000,000, and the C.P.R. depot costing $1,000,000. The new Ricketts theatre, Yorkshire Guarantee Building and Ramsey Hotel, each approximating $500,000, and the Weart Building, costing approximately $700,000.

Yorkshire Guarantee Corporation's Building

An illustration is given of the proposed ten-storey office building to be erected for the Yorkshire Guarantee & Securities Corporation, Ltd., on Seymour street, between Pender and Dunsmuir streets, Vancouver. The building will measure 50 x 120 feet and will be of reinforced concrete construction. The front elevation will be rendered in selected pressed brick with appropriate trimmings of terra cotta, the whole presenting a most pleasing appearance. The structure will be entirely fireproof. The Yorkshire Guarantee & Securities Corporation will occupy the ground floor which will be fitted up for banking, trust and brokerage purposes, with a large counting room, private offices for the departmental managers, vaults, safety boxes, and other features of general banking and financial headquarters. The floors of the banking rooms will be laid in tile with marble baseboards. Hardwoods will be used for the counters and office partitions, and all interior fixtures will be bronze. Two electric elevators afford communication with the upper floors. The succeeding nine storeys are to be elaborately finished in high grade materials, and the [illegible] will be excellently heated, lighted and ventilated. The excavation for the foundation of this structure has been completed and the actual construction work is expected to commence early in the new year. Plans for the building, which is to cost approximately $500,000 were prepared by Messrs. Somervil & Putnam.

Opera House Plans Completed

Plans of the new opera house to be erected by Mr. E. R. Ricketts at Pender street west, Vancouver, are now completed. The building is best described as a theatre and apartment block, as the upper portion will contain apartments only. The lower part of the structure to be used as a theatre will be constructed first, the hotel part facing on Burrard street will be built later. Rapid progress has been made with the excavation for the foundation, and it is expected that construction work will be well under way by the middle of January. The building will be eleven storeys in height, and will be of steel frame construction, with the outside curtain walls of brick. Faced brick and terra cotta will be used on the Pender street elevation. All floors are to be constructed of reinforced concrete. An ornamental iron awning will extend along the entire Pender street frontage, covering the approach to the main entrance. The stage will be equipped with the latest mechanical arrangements permitting rapid setting of scenes and allowing accommodation for the largest acts. The cost of the building is placed at approximately $500,000, and it is expected that the contract will be completed early in August. Mr. E. W. Houghton is the architect and Mr. E. J. Ryan has charge of the construction.

Sound Construction Company's Contract

A contract was recently awarded the Sound Construction Company for the erection of a ten-storey office building for the B. C. Permanent Loan Company, on the corner of Douglas and Yates streets, Victoria. The building was designed by Mr. H. S. Griffith, of Vancouver and Victoria, and will be of steel frame construteion, fireproof throughout. The exterior finish will be pressed granite up to the second floor level, and the remaining nine storeys will be faced entirely with matt glazed terra cotta, with heavy enrichment in the upper storeys. The ground floor is especially designed to suit the requirements of the B. C. Permanent Loan Company, and the National Finance Company. The offices of both companies, as well as the main entrance and elevator halls, will be finished throughout in marble, with marble and mosaic floors, and mahogany woodwork. The upper nine floors will be devoted to offices. These will be finished throughout in hardwood trim. All corridors will be finished with marble wainscoting and terrazzo and marble floors. The estimated cost of this building is placed at $200,000

New Eight-Storey Hotel Building

Work will shortly commence on a [illegible] hotel building to be erected on Hastings Street East, near Main Street, Vancouver. The [illegible]

[illegible] feet, and will be of steel and mill construction faced with pressed brick and trimmed with terra cotta. The materials to be used in the decoration of the main entrance, are marble and tile. An iron canopy measuring 30 feet in length will protect the approach to this entrance. The measurements of the main lobby are 29 x 46 feet. This will be finished in marble wainscoting and Maltese Cross interlocking, rubber mosaic tile flooring. Similar tiling is to be used on the bar room floor. B. C. fir will be used for all interior wood finish. The entire building will contain 154 rooms, replete with modern conveniences. The estimated cost is placed at $[illegible]. Mr. Emil Guenther prepared the plans.

Canada Hotel Started

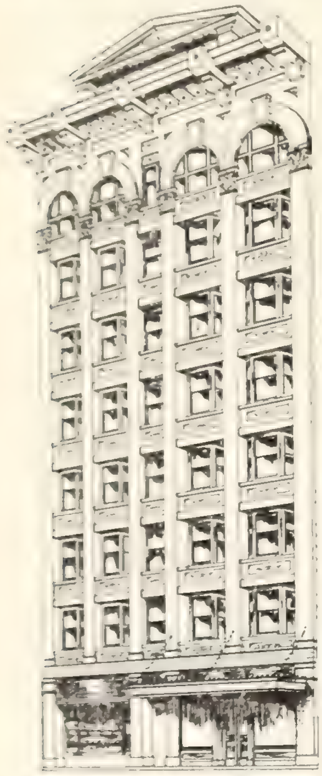
Excavation work is now proceeding on the site of the new seven-storey Canada Hotel on Richards street, between Pender and Dunsmuir streets, Vancouver. This building will occupy a space measuring 50 x 120 feet, and will be of steel and mill construction, faced with buff pressed brick [illegible]. Marble and tile will be used to decorate the main entrance, which opens directly on to a large lobby, measuring 32 x 44 feet. In the rear of this lobby is situated the main dining room, the walls of which are designed to form a series of elaborately decorated arches or arcades. The bar-room will be floored with Maltese Cross interlocking rubber tiling. The six upper storeys of this structure will each contain 26 rooms, which are fitted with all modern requirements. Mr. Emil Guenther prepared the plans and Mr. E. J. Ryan has charge of the construction work. The cost of the building is estimated at approximately [illegible]

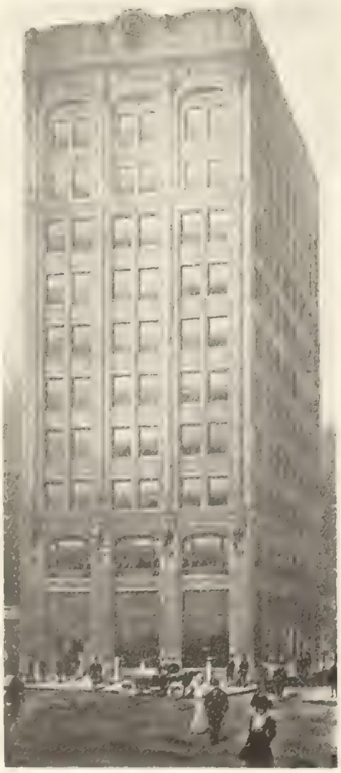
Other Important Undertakings

Work is being rushed on a six-storey mill construction hotel building, located in the 800 block, Howe street, Vancouver. The exterior facing will be buff pressed brick trimmed with terra cotta, and the building will measure 87 x 120 feet. The ground floor will be utilized for a wide entrance, dining room, kitchen, sitting rooms, business offices and three stores. The dining room is 36 x 80 feet in size, and will be finished with beamed ceilings of B. C. fir. There will be in all, 185 rooms on the six floors, and 60 of these will be provided with private baths. The main stairway will be furnished in marble. Messrs. Baynes & Horie designed the building, and are also in charge of the construction. The cost is estimated at approximately $150,000.

Construction is about to commence on a new six-storey apartment block to be located in Fairview, at the corner of Fir street and 7th avenue, Vancouver. The building will cover an area, 50 x 120 feet, and will be of steel and mill construction, faced with red pressed brick. The building is to be heated by steam. The interior finish chosen, is cedar, stained mahogany color. The cost of the structure will be approximately $140,000. The architects are Messrs. Lightfoot and Vickers.

At a recent meeting of the Point Grey Board it was decided to call for competitive plans for four new eight-room school houses to be situated in Shaughnessy, Magee, Point Grey and Eburne. The total cost of the buildings will be $130,000. An architect will be chosen to assist the board in making its final selections.


Proposed Regent Hotel, Hastings Street East, Vancouver


Ten-storey office building projected by The Yorkshire Guarantee Corporation

The seven-storey Canada Hotel, operations on which have just commenced

Work will commence early in January on a five-storey, steel and mill construction building on Robson street, near the corner of Thurlow street, Vancouver. Pressed brick is to be used for the exterior facing. The entrance will be decorated in marble and tile. The ground floor will be occupied by four stores, two three-room apartment suites, and three two-room suites, while in each of the upper floors there will be four three-room suites, and six two-room apartments. These apartments will be fitted with disappearing beds, built-in buffets and desks, and will be heated with steam. For the interior finish B. C. fir will be used. Mr. Emil Guenther prepared the plans for this building, which will cost in the neighborhood of $100,000.

Messrs. Braunton & Leibert, architects, Vancouver, recently prepared plans for a three-storey reinforced concrete building, which is to be erected at the corner of 8th avenue and Yukon streets, for the Standard Milk Company. The building will be faced with white cement, trimmed with red Spanish tile, and will occupy a lot, 77 x 100 feet. The offices of the company are situated on the ground floor, with a bottling plant in the rear. The second floor will be given over to a creamery and sterilizing plant. The sleeping and living quarters of several members of the staff are located on the top storey. The building will cost approximately $70,000.

Plans were recently completed and construction commenced on a four-storey mill construction building at the corner of Powell street and Salisbury Drive, Vancouver. The exterior will be faced with pressed brick, trimmed with stone. The ground floor will contain a corner store, office, stairhall, dining room and kitchen. On the upper floors there are 93 bedrooms. Mr. F. W. Macey prepared the plans and Messrs. Fee & Stevens have charge of the contract.

The large new garages with a holding capacity of 100 cars have just been completed for Mr. H. Hemlow, on Hornby street, Vancouver, at a cost of $45,000. Each garage is 50 feet in width by 120 feet deep. They are built of solid concrete throughout, and comprise two storeys and a basement with the machine shop and storage space in the basement. A feature of these garages is the absence of supporting columns on the different floors, solid concrete beams measuring 3 feet x 4 feet in dimension being employed in the flooring. Steel rolling doors make the buildings fireproof. The Dissette Motor Company and the Pacific Coast Motor Company will occupy these adjoining garages. Mr. W. T. Whiteway was the architect and Mr. J. J. Dissette had charge of the construction.

Canadian Fairbanks Warehouse, Vancouver

During the latter part of December tenders were being called for the erection of a two-storey, mill construction, apartment building on Broadway west, Vancouver. The cost of the building will be approximately $20,000. The exterior facings will be red and buff pressed brick, and fir will be used as inside finish. The building will contain fourteen suites of five rooms each. Messrs. Townsend & Townsend are the architects.

Seven-Storey Warehouse for Canadian Fairbanks Company

The accompanying illustration gives a view of the new seven-storey warehouse building which is being erected for the Canadian Fairbanks Company on Beatty street, Vancouver. The Beatty street frontage is 268 feet, the C.P.R. track frontage 234 feet, and the depth of the building 120 feet, making in all 20,300 square feet of land occupied by the structure. The building will be of mill construction, with exterior facing of pressed brick trimmed with stone, and will cost approximately $150,000. The first floor will contain offices. The basement will be used for the heating plant, and additional storage space. All the other storeys will have space for the storage of hardware. Messrs. Parr, McKenzie & Day are the architects.

The University Competition

The plans submitted by the architectural firm of Messrs. Sharpe & Thompson, old Safe Realty Building, Vancouver, were adjudged first honors in the recently decided competition for plans of the new university of British Columbia, to be erected at Point Grey, Vancouver. Second place fell to the lot of Mr. Douglas Scott Bow, also of Vancouver, while third and fourth prizes were awarded the firms of Messrs. Philip Turner and partner, Montreal, and Symons & Rae, Toronto, respectively. The cash prizes to be received by these four leaders are respectively $4,000, $3,000, $2,000 and $1,000. The first honor winners will enjoy the emoluments further provided in the detail and specification plans that will be required in the actual work of construction. Vancouver city led in number of candidates for the honor of designing the provincial university, five designs being submitted from this city, with three from Victoria, three from Montreal, two each from Toronto and Edmonton, and North Vancouver, Kamloops and Regina also being represented. The committee of award was composed of the Minister of Education, Hon. Dr. H. E. Young, Mr. F. L. Carter-Cotton, Chancellor of the new university, and Messrs. W. Douglas Caroe of London, England, A. Arthur Cox and Samuel McLure, of Vancouver, members of the architectural profession, co-operating with, and assisted by, the Provincial Minister of Public Works, Hon. Thomas Taylor. That the competition proved disappointing is only too apparent judging by the following commentary which occurs in the memorandum submitted by this committee of award to the provincial government:

"The prizes offered, are almost on a scale of lavishness, and the competition should have attracted all the best talent in the country. It was therefore a matter of some disappointment and surprise that only nineteen sets of drawings were submitted, and of these one could not be considered a serious effort. Five others were merely tentative, and of these, one was out of order as being signed by the competitor's name. We were therefore reduced to the consideration of thirteen schemes, and one of these we had to reject as having marks of identification upon it, which are disallowed by instructions. It was therefore disqualified, even if otherwise satisfactory, which was far from being the case. Twelve sets were left from which to make our selection. In other words, one third of the whole number submitted could claim prizes. We are unable to point very clearly to the reasons why the response has not fulfilled our expectations. It may possibly rest with the fact that designs of this kind are of a very technical nature, and in the instructions great latitude was left to the individual architect."

Despite the pronounced opposition of many of the aldermen, the Quebec Legislature have passed many amendments to the Montreal by-laws which will make for civic progress. These reforms give wider scope to the Controllers and abolish in a great measure aldermanic interference, which has proved a hindrance to the well-being of the city. This "pulling" for the various wards has held up much construction, paving, and other work, and has thrown a lot of unnecessary labor on to the shoulders of the Controllers. The latter have now much more latitude, and are able to dismiss men without having to refer such matters to the council. The heads of the various departments will have to supervise detail work which has hitherto been done by the Controllers, who will be able to put the administration of civic affairs on something like business lines. The Board of Control [illegible] up to the present.

Col. Ruttan's Approaching Retirement

FROM Winnipeg comes word of the approaching retirement of Col. Ruttan, who has been city engineer of the western metropolis for more than a quarter of a century. During that time Col. Ruttan has witnessed the most rapid development of any city of its size on the continent, and for that matter in the world, for western Canada stands unique in the annals of rapid progress.

Henry Norlande Ruttan was born at Cobourg, Ont., on May 21, 1848. Previous to making his present connection with the city of Winnipeg he had extended practical experience in railway engineering and contracting. In his military capacity Col. Ruttan possesses a distinguished record. He served in the Fenian Raid and Northwest Rebellion and holds medals for his part in both of these expeditions. He also wears the Long Service Decoration. He was president of the Canadian Society of Civil Engineers in 1910, and it is interesting to recall that he was a member of the first council of that body.

Col. H. N. Ruttan, Winnipeg's City Engineer, who is retiring.

Mr. Ruttan's decision to retire was known last year, but at the request of the mayor and members of council it was not pressed, principally owing to the prevailing uncertainty upon the question of water supply. This now having been practically settled, Col. Ruttan urges that arrangements be made at once to secure another engineer, as his private business plans are now completed.

Personal Mention

Mr. W. P. Near, of the Main Drainage Works, Toronto, has been appointed City Engineer of St. Catharines.

Mr. Frank C. Wardall, formerly located at Banff, Alta., as Supervising Engineer for the Robt. W. Hunt Company, has recently been transferred to St. Louis, Mo., in the employ of the same company.

Mr. Harry A. Paquette has been elected Manager and Chief Engineer of the Lauzon Engineering Company, with headquarters at Levis, Que. Mr. Paquette was formerly Assistant Engineer on the Levis Deep Water Wharf.

Mr. C. H. Topp, Victoria, B.C., has been appointed engineer for the municipality of Esquimalt. He takes charge of all work on hand at present, and later when the new sewage scheme is formulated, he will assume control of that work.

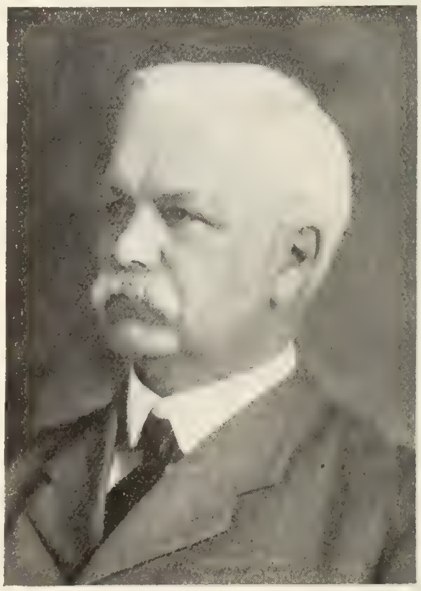
At the annual meeting of the Canadian Society of Civil Engineers, to be held in Montreal on January 28-30, Mr. Phelps Johnson, managing director of the Dominion Bridge Company, will be elected as president, in succession to Mr. W. F. Tye, of Toronto.

Mr. Joseph D. Evans, chief engineer of the Montreal Tramways Company, has resigned on his appointment as construction engineer of the Electric Bond & Share Company, New York. Mr. Evans has been with the Montreal Tramways Company since the spring of 1911.

Mr. W. P. Near, who has received the appointment of City Engineer of St. Catharines, Ont., was, until recently, on the main drainage staff of the city of Toronto. He holds the degree of B.A.Sc. from the University of Toronto and has had considerable experience in his profession.

Lt.-Col. Anderson, C.M.G.

Another signal tribute to the engineering profession in Canada has been made in the honor conferred upon Lt.-Col. Anderson, Chief Engineer of the Department of Marine and Fisheries of the Dominion Government, who becomes a Companion of the Order of St. Michael and St. George. Col. Anderson was born at Levis, Que., in 1857. Educated at Bishop's College, Lennoxville, and at Manitoba College, he entered the civil service as Assistant Engineer of the Marine Department in October, 1874, and was promoted to his present office in February, 1880. He is a Past President of the Canadian Society of Civil Engineers, a Fellow of the Royal Geographical Society and a Member of the Institute of Civil Engineers of Great Britain. Col. Anderson has had an active military career. Until January, 1892, he commanded the 43rd Battalion of the Ottawa and Carleton Rifles. In 1885 he established the Canadian Militia Gazette and edited it for two years. A more detailed sketch of Col. Anderson's career was published in our issue of April 24, 1912.



Lt.-Col. Anderson, C.M.G., Chief Engineer, Department Marine and Fisheries

Messrs. Ross & MacFarlane, the well-known Montreal architects, have dissolved partnership. Mr. Ross, with whom will be associated Mr. R. H. MacDonald, will continue to carry on his profession at No. 1 Belmont, while Mr. MacFarlane will practice at offices in the New Birks Building.

Mr. John S. MacLachlan, of Victoria, B.C., has been appointed resident government engineer for Vancouver Island, with headquarters at Victoria. The appointment of Mr. MacLachlan to this important post marks the conclusion of a long agitation on the part of Vancouver Island for suitable recognition, in regard to the magnitude of her engineering projects. The harbor improvements alone, already provided for by the government, almost demand the entire attention of an official with headquarters at Victoria.

Mr. W. D. Barclay, general manager of the eastern lines of the Canadian Northern Railway, died at Riverside, Cal., December 13. Mr. Barclay was sixty years of age, and a native of New Brunswick. He was a civil engineer and formerly general manager of the Galt road between Medicine Hat and Lethbridge, Alta. Later he became a partner in the firm of Foley Brothers, railroad contractors.

Mr. J. P. Forde, of Revelstoke, for the past two years resident provincial engineer for that district, has been appointed resident federal government engineer for the whole of Kootenay electoral riding, in succession to Hon. F. W. Aylmer. Mr. Aylmer has been in charge of the ridings of Yale-Cariboo and Kootenay, and the district has now been divided into two parts, on account of the heavy program of public works which is in progress, and which is planned for next year. He will in future have charge of Yale-Cariboo riding. Mr. Forde is an old-timer in British Columbia. Twenty-two years ago he joined the staff of the Canadian Pacific Railway in British Columbia, and for seven years, previous to his appointment as resident provincial engineer, was resident engineer for the company at Revelstoke.

Mainly Constructional

The News in Brief—From Coast to Coast

The Canadian H. W. Johns-Manville Company will shortly open a branch at Calgary.

Building permits for greater Victoria for 1912 will, it is expected, exceed the sum of $12,000,000.

The industrial bureau of Calgary will soon ask the city council to erect a large convention building.

Building permits at Moose Jaw for the first nine months of 1912 totalled $4,932,680, as against $2,431,744 for the whole of 1911.

A two and a half storey brick factory is to be constructed at Toronto for the Rolph Clark Company at a cost of $160,000.

An average of over one mile of railroad per day for 1912 has been built by the Canadian Northern Railway in the Province of Alberta.

It has been suggested that a tunnel be built from Windsor to Detroit as a means of celebrating the one hundredth anniversary of peace.

The roofing mill of the Standard Paint Company of Canada, just outside Montreal, has been destroyed by fire, the total damage being about $100,000.

The City Beautiful Association of Vancouver are endeavoring to prevent the plans for the stadium being accepted, and are taking legal advice on the matter.

The first annual banquet of the Moose Jaw Builders' [illegible] took place on December [illegible]. About [illegible] were present and a very successful evening was spent.

Mr. John J. McDonald, who was for some time assistant city engineer at Medicine Hat, died there recently. He had lately been employed by the Provincial Government.

A clay deposit has been found at [illegible] suitable for hollow tile and red brick. It is expected that a plant will be erected there and that the industry [illegible] Saskatoon.

The big cement plant, which will be erected by the Hunt Engineering Company, of Kansas City, at Medicine Hat, will cost in the neighborhood of $1,000,000 and the capacity is expected to be 2,000 barrels daily.

The ratepayers of Toronto on January 1st passed eight money by-laws, which amounted to practically $13,000,000. This figure includes approximately $7,000,000 for a duplicate water supply system at Scarboro Beach.

Provision is made in the Budget of the Montreal Council for better financing of the road department, a permanent repair staff being appointed. The pay of day laborers is to be advanced from $2.10 to $2.25 per day.

Mr. W. H. Milner, architect, Seattle, Wash., has been commissioned to prepare plans for the new business block to be erected in Victoria for the Royal Bank of Canada. Details of the proposed structure are lacking.

The appeal of the Grand Trunk and Canadian Pacific Railway Companies to the Governor-General-in-Council against the order of the Dominion Railway Commissioners on the Toronto viaduct has been indefinitely postponed.

The total assessment on city property at Fort William, Ont., in 1912, according to the Assessment Commissioner's figures just made public, amounts to approximately $34,000,000,—an increase of $9,000,000 over the figures of last year.

We have received from Messrs. Mussens Limited, dealers in railway, contractors', mining, municipal, machinery and supplies, a useful office calendar lettered in good bold type and containing interesting announcements of the firm's principal lines.

It is likely that Canada will be well represented at the third international congress in London, Eng., on June 23-28, of people interested in the good roads movement. It is expected that every province will send one or more delegates to the convention.

It was announced recently that work will be begun on or before April 1st on the erection of a drydock and shipbuilding plant at Sault Ste. Marie to cost $1,500,000. The plant will be completed in one year. The contract will be awarded, it is said, to London, Eng., parties.

On December 27, Mr. Walter H. Fulweiler, Engineer, Research Department, United Gas Improvement Company, Philadelphia, delivered an illustrated lecture on the "Manufacture of Refined Water Gas Tar," before the graduate students in Highway Engineering at Columbia University.

The Mount McKay Brick and Tile Company, Limited, started operations recently at Fort William, with a working capacity of 20,000 bricks per day. This amount will, however, be largely supplemented in the spring when extra machinery will be installed to increase the daily production to 100,000 per day.

The clay-working industries of the United States had in 1911 a production valued at $162,236,181, according to the United States Geological Survey, which has just issued a chart, compiled by Jefferson Middleton, showing the total output by states of all the different clay products. The total production of common brick was 8,475,277,000, valued at $49,-[illegible]

Lumber interests in VanBuren and north Aroostook county are behind a bill which is to be presented to the Maine legislature this winter authorizing a railroad bridge between VanBuren (Me.), and Saint Leonard's (N.B.), connecting the Bangor & Aroostook railroad system in Maine with the Canadian Pacific, the Grand Trunk and the Intercolonial railroad.

The Victoria branch, Canadian Society of Civil Engineers, [illegible]

[illegible] being elected: Chairman, Mr. F. C. Gamble (re-elected); vice-chairman, L. W. Jones; treasurer, A. E. Foreman, (re-elected); Executive, Messrs. F. C. Gamble, A. E. Foreman, R. W. McIntyre, E. H. Harrison, J. H. Gray; Auditors, R. A. Rainbridge, H. M. Bigwood.

The province of Quebec has been divided into ten districts for the purposes of public health, and inspectors have been appointed for seven of these districts. For the remaining three there were no candidates, owing to the poor [illegible] remuneration offered. The men who desire to secure the positions must have a special university training, and the maximum salary is only $1,500 a year.

Large extensions are to be made by the Grand Trunk Pacific to the company's shops at Rivers, Man., which is the first divisional point on the main line west of Winnipeg and is the headquarters for repair work on both the eastern and western divisions of the railroad at the present time. These extensions will involve the expenditure of thousands of dollars and will include the erection of houses for the company's employees.

Montreal plasterers have come to an agreement with their employees by which wages have been re-arranged. The agreement provides for 47½ cents an hour from January 1 to June 1; 50 cents an hour from June 1 to September 1; 55 cents an hour from that date forward. Any of the parties wanting any alteration must give one year's notice. The hours are to remain as at present, namely, an 8-hour day, from 8 a.m. to 5 p.m.

The government have appointed a commission to make a final decision as to the site to be adopted for the proposed dry dock at Quebec. The commissioners are Mr. E. D. Lafleur, Chief Engineer of the Public Works Department at Ottawa; Mr. A. D. Swan, M. Inst. C. E., Assistant Chief Engineer of the Montreal Harbor; and Mr. W. F. Wilson, M. Inst. C. E., of Messrs Coode, Son & Matthews, of London, Eng. These gentlemen have full powers to decide on the site.

The Montreal Civic Controllers have under consideration the question of appointing a special engineer. Many works of importance will be commenced in the immediate future, and the Controllers are of opinion that an expert should be retained so that the city may be able to secure expert opinion on the various projects. The present staff at the City Hall have no time to take up such work, as they are all engaged on municipal public works, and will be so occupied for a very long time to come.

An Edmonton despatch states that contractors on the Grand Trunk Pacific contemplate the completion within the next three months of 90 miles of track on the main line in British Columbia, west of Mile 53, as well as the construction of a big steel bridge over the Rue Shuarp River. The report goes on to say that commencing at the present head of steel on the Fraser River with the first of the year, the steel gangs will work at full pressure throughout the winter months and by the middle of February 40 miles will have been completed. Bridge construction will then be commenced.

The John S. Metcalf Company, Limited, of Montreal, have received a contract for the contemplated addition to the No. 1 grain elevator at the Montreal Harbor, the contract price being $600,000. The addition, which will be constructed of reinforced concrete, will give an accommodation for the storage of a further million and a half bushels, making a total capacity of 2,600,000. Work is to be rushed in order that the addition may be ready for the grain trade of 1913. The John S. Metcalf Company are now putting the finishing touches on the No. 2 elevator, which was opened recently by the Hon. J. D. Hazen.

The first train has crossed the new C. P. R. bridge at Lachine, P.Q. On the train were Messrs. D. McNicoll, vice-president of the line; P. B. Motley, engineer of bridges; A. T. MacTier, general manager of Eastern lines; J. W. Leonard, C. Murphy, and F. L. Wanklyn. The party were joined at Highlands station by Messrs. G. H. Duggan, F. P. Sherwood and James Findlay, of the Dominion Bridge Company. The train went slowly over the bridge, and after passing through the two new spans, the train was stopped, and Mr. Motley introduced the Dominion Bridge Company's officials as those who were chiefly responsible for the floating in of the new spans. Mr. McNicoll spoke in complimentary terms of the work.

The Government of British Columbia will proceed immediately with the construction of a bridge over the upper Nechaco River, in addition to the large steel bridge to be erected by the Grand Trunk Pacific. Work on the first named structure will proceed as soon as the machinery and supplies which are being brought in from Quesnel can be got upon the ground. Arrangements are being made at Fraser for lumber for the construction camps and a big force of railroad men will be established there shortly. The Grand Trunk Pacific right-of-way is cleared through the townsite and for several miles on either side.

The annual report for 1912 of the chief engineer of the Grand Trunk Pacific Railway has been issued in Winnipeg by B. B. Kelliher, and covers the work of the past twelve months up to December 20.

This report runs in part as follows; Construction has been undertaken on 568 miles of main line and on 688 miles of branch lines, making a total of 1,251 miles of line on which clearing, grading and track-laying have been done. Track has been laid on 128 miles of main line and on 331 miles of branch lines, making a total of 459 miles of railway completed, exclusive of second tracks and sidings.

At a special meeting of the Saanich, B.C., council recently, a petition, signed by owners assessed at over one million dollars, was presented, and approved, for the permanent paving with an asphalt concrete surface of the main roads in the Saanich municipality. They suggested in the petition that the loan of not less than $300,000 should be repayable with interest in twenty years. The by-law will now be prepared by the solicitors, and the works committee will select the roads which are to receive treatment. It is the intention to map out a large amount of the work next year, and give first attention to the main trunk thoroughfares of the peninsula.

Mr. A. O. Powell, engineer in charge of the New Westminster harbor project, recently published the specifications for the work of extending the waterline on Front street 192 feet into the river. The work is divided into three sections, first, 700 feet long; second, from Tenth street to nearly Fourth street, about 3,500 feet long; and the third from the end of the second section to east of Fourth street. Some idea of the magnitude of the work will be gathered from the facts that 805,600 piles of all varieties and lengths will be used in the construction, and 1,427,000 cubic yards of gravel in the fill. The quay front will take 55,950 tons of rock. The work will consist of extending the line of the present waterfront out into the river to a new harbor line. The extension will be made by a solid fill of earth, sand or gravel, having an outer slope of one, or one and one-half. The slope will be protected by the revetment rock, approximately 2 feet, 6 inches thick, and where necessary by rock, too. Over the slope will be a round pile quay wall, constructed in general accord with the plans, but subject to such modifications as the engineer may direct, to suit the contingencies of the work, and adaptability to the use of the water-front occupants. Back of the quay wall will be a curtain of creosoted sheet piles, placed close together, and securely, before any filling is undertaken.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Aldboro, Ont.

Drain under the contemplation of town council. Engineer, G. A. McCubbin. Reeve W. W. Campbell will shortly call for tenders for extension of Garlick drain, 900 yards.

Blenheim Twp., Ont.

Drainage planned by township council. By-law passed. Clerk Hugh Allan, Richwood, Ont., will call for tenders.

London, Ont.

Roadway contemplated by city council (Park Commsn.) Commissioner, Emery B. Hamilton. Plans are to be prepared at once for boulevard drive extending some miles about the city. Work to start in spring.

Montreal, Que.

Macadam roadway to cost $19,000 planned for Municipality of Greenfield Park. Sec.-treas., F. Hornby, Greenfield Park. Town will macadamize the Lapinier's Road. Work to start as soon as possible.

New Liskeard, Ont.

Sewers to cost $10,000 contemplated by town council. Particulars from clerk, P. R. Craven.

Port Arthur, Ont.

Pipe, etc., required by city council. City engineer, L. M. Jones. Tenders received by Commissioners of Utilities, J. J. Hackney, until Feb. 13. Specifications etc., at office of engineer, Port Arthur and M.C.R. Toronto. 40,200 lin. ft. 24 in. pipe, 5/16 in. metal, 2,700 lin. ft. 24 in. pipe 5/16 in metal, 2,700 lin. ft. 24 in., ¼ in. pipe, 6,000 lin. ft. 3/16 in. metal, 12 in. pipe, 30-24 in. gate valves, 9-16 in. gate valves, 2-24 in. check valves.

Queensborough, B.C.

Sewerage and drainage for Lulu Island planned by the town council. Engineer has been instructed to make report on best method.

Simcoe, Ont.

Sewerage system to cost $66,000. Engineers, Chipman & Power, Mail Bldg., Toronto. Engineers for laterals, Fairchild & Marston, Simcoe. Tenders to be called for about March 1, 1913. Further information from clerk, W. C. McCall.

Toronto, Ont.

Water works extension to cost [illegible] 000 authorized by Board of Control. Mayor, H. C. Hocken. By-law voted on by ratepayers Jan. 1, 1913.

Storm sewer system to cost $954,000 planned by Board of Control. Mayor, H. C. Hocken. By-law voted on by ratepayers Jan. 1, 1913.

Filtration plant (addition) to cost $1,375,000 planned by Board of Control. Mayor, H. C. Hocken. By-law voted on by ratepayers Jan. 1, 1913.

Garbage disposal plant to cost $1,000,000. Mayor, H. C. Hocken. By-law voted on by ratepayers Jan. 1, 1913.

Village de Courville, Que.

Drainage planned by municipal council. Sec.-treas., Alfred Brousseau. Tenders received by secretary until Jan. 15. Specifications and form of tender at office of engineers, Messrs. Joncas, Tremblay & Malouin, Banque Nationale Bldg., St. Roch, Que.

CONTRACTS AWARDED

Edmonton, Alta.

Asphalt paving. Engineer, A. J. Latornell. Contracts were let to the Bitulithic Paving & Contracting Co., Empire Block, for 125,000 sq. yds. asphaltic concrete pavement. To the Crown Paving Co., 325 7th avenue west, Calgary, Alta, for 75,000 sq. yds. and to Taylor & Mercer, 25,000 yds. to be increased to 50,000 yds. if satisfactory. Contracts for remaining 150,000 sq. yds. will be let in February.

Hanover, Ont.

Waterworks (extension) planned by town council. Clerk, John Taylor. Engineer in charge, James Warren. General contractor, Jno. Hartnett, 312 Western avenue, Toronto. 6 in. and 4 in. mains and connections.

London, Ont.

Pipe line to cost $12,000 from incinerator to Victoria Hospital. Work to start at once. Clerk, Samuel Baker. General contractor, Canadian Johns-Manville Co. Ltd., 438 Park avenue. Work to start at once.

Mira Bay, N. S.

Coal shipping pier, cost $100,000. for Cape Breton Coal, Iron & Railway Co., Ltd., Broughton, N.S. President, Horace Mayhew, Chester, England; Secretary-treasurer, E. Noel Humphreys, Broughton. General contractor, J. W. Dobson, Sydney, N.S. 1,000 ft. long. first section, 400 ft., to be completed by July, 1913, balance to be erected later.

St. Vincent De Paul, Que.

Paving to cost $95,000 planned by the municipal council. General contractor, M. J. Stack & Co., 167 McCord street, Montreal.

Vancouver, B.C.

Steel water pipe to cost $43,818. Clerk, Wm. McQueen. Pur. Agt., James Stuart. General contractor, Wilkinson Co. Ltd., 846 Beach street, for 26,400 ft. 6 in. steel pipe; 6,600 ft. 8 in. steel pipe; 5,280 ft. 12 in. steel pipe. Contracts for the larger amounts not let till by-law for funds is passed.

Railroads, Bridges and Wharves

Province of Alberta

Railroad. C. P. Ry. Co. have been authorized to construct railroad from a point on its Hardisty Sub. Div. at Sedgewick Sec. 9-44-12-W-4-M to a point in Sec. 35-40-13-W-4-M Alta. mileage 0 to 22.46.

Cainsville, Ont.

G. T. Ry. Co. have been authorized to construct bridge No. 18 mileage 73.21 from Black Rock on 20th Dist. middle division of its railway across T. H. & B. Rly. near Cainsville.

Edmonton, Alta.

Railroad. The Western Dominion Ry Company's location of railway from point on line of the Pincher Creek, Cardston & Montana Ry. in Sec. 34-6-1-W-5-M to a point in the Sarcee Indian Reserve, mileage 0 to 130 has been approved.

Hamilton, Ont.

Wharf or retaining wall for Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Chairman Harbor Commrs., Geo. J. Guy. Time extended for receiving tenders by secretary to Jan. 10, 1913.

Kaslo, B.C.

Wharf to cost $70,000. 800 ft. in length. Dom. Govt., City Council and C. P. R. Grading will be done by city and slip built by C. P. Ry. Work will start as soon as possible.

Middleton, N.S.

Railroad buildings. It is probable that next year the Dominion Atlantic Railway (C.P.R.) will remove the divisional headquarters and car shops from Kentville, N.S., to Middleton, N.S. If carried out a railway station, round house, 75,000 gal. water tank and car shops will be built at Middleton at a cost of $100,000. This will also mean the erection in 1913 of 25 to 50 houses.

Province of Saskatchewan

Branch railroad. C. P. R. Company's location of branch railway from mileage 0 to 46.84 from Hawarden to Floral, Sask., has been authorized and approved.

Quebec, Que.

Bridges. Prov. Govt., Roads Dept. Deputy Minister, B. Michaud, Parliament Bldgs., Quebec. Tenders received by Deputy Minister until Jan. 27th for both small and large bridges between St. Augustin, County Porteneuf and Charlemagne, County L'Assomption Que.

Ramsay, Ont.

Bridge. C. P. Ry. Co. have been authorized to construct bridge [illegible] over [illegible]

Red Deer, Alta.

Railroad. Alberta [illegible] Railway Company's [illegible] Rocky Mountain to Yellowhead Pass line from 1 mile [illegible]

[illegible] west of Red Deer Alta., has been approved.

Sarnia, Ont.

Wharf, [illegible] 200 ft long by 71 ft wide for Dominion Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Government Engineer, Major Lamb, Ottawa. Plans drawn.

St. Catharines, Ont.

Bridge. The Niagara, St. Catharines & Toronto Railway Company will replace timber trestle at Gulley known as "Ten Mile Creek" with steel swing bridge, as this is the point at which they will cross the new canal. Supt., Wm. Robertson, Niagara Branch.

Railway construction (extension) planned for Niagara, St. Catharines & Toronto Railway. (Nia. Branch). Supt., Wm. Robertson. Company expects to start work in about 6 weeks on 2 timber trestles, 150 x 200 to cost $15,000.

St. Marys, Ont.

Station for C. P. Ry. Co. Plans in progress. Further particulars from Supt. King, London, Ont.

Salmo, B.C.

The Great Northern Ry. Co. have been directed to erect suitable station and platform at Salmo.

Toronto, Ont.

Viaduct to cost $2,500,000, Bloor St., authorized by Board of Control. Mayor, H. C. Hocken. By-law voted on by ratepayers Jan. 1, 1913.

Dock to cost $1,000,000 contemplated (Ft. Yonge St.) for Richelieu & Ontario Navigation Co., 46 Yonge street. Gen. Mgr., Mr. Chaffee. Plans will be prepared.

Vancouver, B.C.

Bridge planned by the city council. Clerk, Wm. McQueen. Plans, specifications, etc., at office of engineer, C. A. P. Turner, Room 424, Vancouver Blk., and City Engineer. Tenders received by clerk until Jan. 30, 1913.

Ferry to cost $142,000 planned by city council. Clerk, Austin Brown. By-law to guarantee debentures issued by the North Vancouver City Ferries Ltd., passed on Dec. 14.

Dredging (False Creek). Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Specifications, etc., at office of C. C. Worsfold, district engineer, New Westminster, and Dept., Ottawa. Tenders received by secretary until Jan. 31, 1913.

Bridge (Seymour Narrows) under contemplation of the Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Survey work is to start as soon as possible.

CONTRACTS AWARDED

St. Vincent De Paul, Que.

10 bridges to cost $15,000. General contractor, M. J. Stack & Co., 167 McCord street, Montreal. Reinforced concrete construction.

St. Catharines, Ont.

Railway (extension) for Canadian Northern Railway (Niagara, St. Catharines & Toronto Division). Supt., W. Robertson. Purchasing agent, Mr. Wilson. Work is being done by company, 75 per cent. of grading completed. Expect to have line in operation June 1, 1913.

St. Johns, Que.

Steel bridge to cost $197,000 (Chambly Canal & River Richelieu) for Municipalities of St. Johns and Iberville. Sec., J. A. Raymond. Con. engrs., Beaulne & Mercier, 503 Power Bldg., Montreal. General contractors, Quinlan & Robertson, 4412 St. Catherine, Montreal. Reinforced concrete flooring, concrete piers. To be completed by May 1, 1913.

Public Building, Churches, Schools, etc.

Beamsville, Ont.

High school to cost $20,000 (King St.) is contemplated by High School Board. 2-sty. Plans will be prepared.

Duncans, B.C.

School planned by town council. Tenders received by architect W. T. Whiteway, 543 Hastings street west, Vancouver. 8 rooms, concrete foundation, frame construction.

Esquimalt, B.C.

School to cost $26,000 contemplated by the town council. Clerk, Thos. Shepherd. 8 rooms, modernly equipped. Will be built in 1913.

Hamilton, Ont.

Remodelling Club Rooms to cost $15,000 (Aberdeen avenue) for Inglewood Club, Ltd., c/o W. J. Southam, Spectator Bldg. Architects, Stewart & Witton, 2 Hughson street S. 3-sty., tile and oak floors. Plans in progress.

London, Ont.

Federal Square and City Hall to cost $250,000, Queens avenue and Wellington street, planned by city council. Clerk, Samuel Baker. By-law voted on by ratepayers Jan. 1, 1913.

Oshawa, Ont.

Public market to cost $6,000 under consideration of the town council. Clerk, Thos. Morris. Plans will be prepared.

Ottawa, Ont.

Church, York and King, contemplated for St. Johns. Provision will be made for Sunday School and Ladies Auxiliary quarters. Plans will be prepared.

Port Arthur, Ont.

Armory, cost $100,000. Tenders received by Secretary, R. C. Desrochers, Dominion Government, Department of Public Works, until January 22nd, 1913. Specifications, etc., at office of City Clerk, Port Arthur, H. E. Matthews, Supt. Arch., of Dom. Pub. Bldgs., Winnipeg, Man., and at Dept., Ottawa.

St. John, N.B. (Lancaster)

Laundry for hospital for Dom. Govt., Dept. of Public Works. Premier, J. K. Flemming, Woodstock, N.B. Plans will be prepared.

St. Thomas, Ont.

Y. M. C. A., cost $50,000, M. C. R. Park, contemplated. Site has been leased for new building and plans will be prepared.

Shelburne, Ont.

Church, cost $7,000, for Anglican Church Congregation. Architect, A. T. Green, Owen Sound. Pastor, J. S. Adamson. New tenders called by Wardens, G. Berwick, Shelburne; H. White, Owen Sound.

Saskatoon, Sask.

Barracks for R.N.W.M.P. contemplated by the Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Plans will be prepared.

Toronto, Ont.

Theatre, cost $9,000, Bloor and St. Clarens ave., for S. Bloom & Co., 978 Queen street west. Architects, Redmond & Beggs, Kent Bldg. General contractors, Bell Bros., 39 Howard Park avenue. Tile floors, felt and gravel roofing. Seating, grill work, ventilating system required.

Balconies, cost $3,000, for Sick Children's Hospital, College street. Architect, F. C. Lee, Pacific Building. Structural steel construction, concrete floors. Plans drawn.

Addition to school, Gerrard street E., planned by Board of Education. Sec.-treas., W. C. Wilkinson, City Hall. 2-sty., brick and structural steel; 6 new rooms and new gymnasium.

Vancouver, B.C.

Club House, Jericho Beach, planned for The Country Club. Director, Dr. W. L. Coulthard, 615 Hastings street W. Meeting will be held in a few days to discuss rebuilding club building recently destroyed by fire.

Co. of Northumberland, Ont.

Railroad. C.L.O. & W. (C.P.R.) Co. have been authorized to construct railroad from mileage 99.92 to 105.91 across 9 highways in Co. of Northumberland.

Victoria, B.C.

Cathedral planned for R. C. Church Diocese. Bishop, Alex. MacDonald, P. P. Architect, J. C. M. Keith, 416 Sayward Bldg. Site has been selected in Bishopsclose on which will be erected a large structure.

CONTRACTS AWARDED

Nanaimo, B.C.

Mine rescue station to cost $5,000 for Prov. Govt., Dept. of Public Works. Engineer, J. E. Griffith, Victoria. General contractor, Mesher Bros.

Norwood, Ont.

Drill hall. Dom. Govt., Dept. of Pub. Works. Sec., R. C. Desrochers, Ottawa. General contractor, Robert Bogue, Peterboro, Ont. 100 x 64, interior finishing and heating required. Foundations in.

Victoria, B.C.

Club House to cost $16,000 for The Victoria Yacht Club. Architects, Rochefort & Sankey, 217 Pemberton Blk. General contractors, Fulton Bros. 2-stys.

Business Buildings and Industrial Plants

Buckingham, Que.

Pulp mill, extension, for the James McLaren Co., Ltd. In charge, Mr. McBain. One storey, 180 x 80, concrete walls and floor, machinery required. Addition to use 5,000 cords of spruce per year. Plans will be prepared.

Galt, Ont.

Two stores, cost $5,000, west side Ainslie street, for Robert Kerr (flour and feed). 2-sty. and basement, 43 ft. 3 in.

x 115, solid brick front. Plans will be prepared.

Hamilton, Ont.
Stores and apartments planned for Dennis Biggar, Canada Life Bldg. Architect, A. W. Peene, 2 King street w. Owner has now decided to erect stores and apartments instead of addition to hotel, 4-stys.

Lauzon, Que.
Boot and shoe factory is under contemplation. Further particulars from Secretary-Treasurer, Lauzon.

Lethbridge, Alta.
Creamery and cold storage planned for The Lethbridge Creamery Co., Ltd. Interested, A. & L. A. Rigimbal, A. T. Gould and Mr. Hubbard. Company has been incorporated at $25,000 with permission to increase stock to $100,000.

London, Ont.
Three stores, Adelaide street and Hamilton road, for E. Slobasky, 111 Clarence street. Two storeys, plate glass, store furnishings, etc. Plans will be prepared.

Structural steel plant to cost $25,000 planned for The Dennis Wire & Iron Works Co., Ltd., 266 Dundas street. Mgr., E. R. Dennis Ratepayers voted on by-law January 1st.

Magog, Que.
Foundry, John street, considered, for Magog Foundry Co., Ltd. Town secretary, Alf. Tourigny, Main street. Building to be erected next summer. Plans are under way.

Montreal, Que.
Warehouse, St. Catherine and St. George streets, contemplated for Messrs. Z. Fineberg & Sons, 62 St. James street. 10 storeys. Plans will be prepared.

North Sydney, N.S.
Telegraph office to cost $25,000, for Western Union Telegraph & Telephone Co., Ltd. Reinforced concrete. Plans in progress.

Prince Albert, Sask.
Business block to cost $75,000 for A. J. Manville et al. Architects, Creighton & Crowther, Imperial Bk. Block. Plans have been prepared and work will start in the spring.

Sackville, N.B.
Three stores, Bridge street, for Fawcett Bros., Capt. Peter Hanson and Jas. H. Teare. 70 x 80, stone foundation, pressed brick construction, stone trimming, felt and gravel roofing, store fixtures and fronts. Plans in progress.

Sandwich, Ont.
Steel manufacturing plant, cost $20,000,000, contemplated for United States Steel Corporation of New York. Plans will be prepared.

Sarnia, Ont.
Plant is under contemplation for the manufacture of Automatic Engine Indicators. Interested, Geo. Brown, Engineer, Pere Marquette International Ferry. Plans will be prepared.

Saskatoon, Sask.
Hotel to cost $[illegible],000 [illegible] for Sidney B. Cole, 1st avenue S. Architects, Thompson, Daniel & Colthurst, Central Chambers. [illegible]-sty. and basement, 50 x 140, cement foundation, white terra cotta hollow tile, red brick and structural steel construction, tile, fireproof and hardwood floors, metal ceilings; 1 passenger and 1 freight elevator. Plans drawn.

Brick factory planned for The Saskatoon Trussed Wall & Bldg. Co. (capital $100,000). Interested, C. Gohn, Pres., Jno. H. Bolton, V.P., Jno. H. Cummings, Sec.-treas. Capacity 6000 bricks per day which equals 24,000 ordinary bricks. Work to start about April 1, 1913.

Stratford, Ont.
Creamery. John Brown, c/o Stratford Creamery, 108 Erie street, has purchased site near here and plans will be prepared. Machinery and equipment required.

Taber, Alta.
Brick and clay product plant contemplated for the Canada West Mines. Manager, Mr. Heward. Plans will be prepared and plant erected shortly.

Toronto, Ont.
Addition to warehouse, cost $4,000, Yonge street, for S. Garfunkle, 316 Bathurst street. Architect, J. H. Galloway, 23 Toronto street. One storey addition, brick, pine floors, felt and gravel roofing. Plans drawn.

Jennings & Ross, Limited, Engineers and Contractors, have started operations on the Christie-Brown building on King and Frederick streets.

Stores and residences to cost $8,800, Jones avenue, for W. Milstead, 59 Leonard avenue. Architect, C. M. Hare, 47 Havelock street. Stone foundation, brick construction. Plans drawn.

Store and residence to cost $3,000, Geary and Deleware avenues, for G. W. Montgomery, 40 Geary avenue. Architect, P. H. Finney, 79 Adelaide street E. 2-sty., 22 x 46, brick construction and foundation. Plans drawn.

Hotel to cost $2,000,000 contemplated for Ernest G. McConkey, King street west. Architects, Warren & Wetmore, New York, prepared sketches. 12-sty., 90 x 212, structural steel, brick, tile, terra cotta and marble construction, 500 rooms.

Alterations to store to cost $5,000, 99 King street west, for Wickson & Gregg (in trust) Kent Bldg. 4-sty., brick, cut stone and structural steel construction. Tenders called.

Factory to cost $30,000, College and Euclid avenue, for Crown Tailoring Co., Ltd., 38-40 Adelaide street west. Mgr., W. J. Brandham. Architect, C. F. Wagner, 15 Toronto street. 4-sty., 130 x 50, stone and cement foundation, brick and structural steel construction. Plans drawn.

Storehouse to cost $3,800, 289 Sorauren avenue, for Dom. Bridge Co., Geo. B. Evans (Ontario Agt.) Imperial Life Bldg. Brick and structural steel construction, felt and gravel, galvanized iron roofing. Plans drawn.

Addition to office building of World Newspaper Co., 40 Richmond street W. Pres., H. J. MacLean. Sec.-treas., Harry Goss. Architect, C. J. Gibson, Janes Bldg. 4 additional storeys, structural iron and art stone construction. Plans drawn.

Vancouver, B.C.
Garage for H. A. Bowers, 1455 Georgia street. Architects, Doctor, Stewart & Davie, 578 Seymour street. 2-sty., 66 x 72, reinforced concrete construction. Plans in progress.

Victoria, B.C.
Store and office building, Douglas St., for Fletcher Bros., 1231 Government St. 5-sty., 30 ft. frontage. Site has been purchased and plans will be prepared.

Winnipeg, Man.
Plant contemplated by the Winnipeg Steam Heating Co. Representative, G. Montague Black, 306 McArthur Bldg. Company have been granted 30 year franchise by city for central steam heating plant, $4,000,000 to be expended. About $100,000 will be expended for construction before Sept. 1, 1913.

Wellesley, Ont.
Cheese factory. The dairymen of the district are organizing a new company to erect and equip cheese factory. Work will probably start in spring. Equipment required. Further particulars from P. F. Schummer, St. Clements.

CONTRCTS AWARDED

Brantford, Ont.
Potting and green house, cost $2,500, for Harry Cockshutt, 152 Dufferin ave. Builder, Jesse Bartle, 172 Darling street. One storey, brick, 17 x 25, glass, 18 x 50, brick and glass construction, cement foundation, slate and glass roofing.

Hamilton, Ont.
Addition to factory to cost $40,000 for Canada Steel Goods Co., Arthur avenue. Pres., Arthur Hatch. Architects and general contractors, Stewart & Witton, 2 Hughson street S. Sub-contracts to be let shortly. 2-sty., 150 x 120, cement foundation, reinforced concrete and structural steel construction.

Lethbridge, Alta.
Brewery for The Lethbridge Brewing & Malting Co. Architect, Bernard Barthel, 127 N. Dearborn street, Chicago, Ill. General contractors, Smith Bros. & Wilson. Structural iron, Man. Bridge & Iron Works, Winnipeg, Man. 4-sty., 47 x 100.

Montreal, Que.
Stables, cost $10,000, for Geo. Hall Coal Co. of Canada, Ltd., 126 St. Peter street. Architect, J. R. Gardiner, 49 Beaver Hall Hill. General contractor, R. Ryan, 697 Atwater ave. Two storeys, 42 x 128, cement foundation, brick construction.

Alterations to stores to cost $3,500, Cerin street, for Montreal Light, Heat & Power Co. Builder, D. G. Loomis & Sons, St. Patrick avenue. 3-sty., 150 x 90, brick, stone foundation. 1 freight elevator.

Ice plant to cost $32,000, Cote St. Paul road, for E. L. Baugh & Co., 23 Royal Ins. Bldg. Builder, Northern Construction & Supply Co., Ltd., 23 Royal Ins. Bldg. 1-sty., 150 x 125, stone foundation. Excavation started.

Penetang, Ont.
Factory (extension) for Gildey Boat Co., Ltd. Mgr., H. M. Warnock. General contractor, W. [illegible], [illegible] street. Cement and brick construction, machinery required.

Sherbrooke, Que.
Stores and offices to cost $70,000, Wellington street, for Quebec Central Ry.,

(Continued on page 70)

Tenders and For Sale Department

Tenders for Pier

Tenders will be received by the undersigned up to 5 p.m. Monday, the 27th day of January, 1913 [illegible] Centre Pier in the [illegible] for the Southampton Bridge. Plans and specifications for a Concrete Pier can be seen at the office of the undersigned. Tenderers may [illegible] of sub-structure [illegible] furnish plans and specifications [illegible] details therefor. Party whose tender is accepted to furnish satisfactory security for [illegible]

Lowest or any tender not necessarily accepted.

Tender to name date by which to be completed.

Marked cheque for five per cent. of tender to accompany each tender, which will be returned if tender not accepted.

(Signed) P. A. MALCOLMSON,
County Clerk,
Kincardine, Ont.

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope "Tenders for Valves," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following valves. F.O.B. Port Arthur:—

24 in. Gate Valves, equipped with operating gears	30
12 in. Gate Vales, without gears	9
24 in. Check Valves, with 3-in. by-pass ..	2

Specifications can be seen at the office of the City Engineer, Port Arthur, or the office of the Contract Record and Engineering Review, Toronto, Ont.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur,
December 28th, 1912. 1-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope, "Tenders for Lapwelded Steel Pipe," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following Lapwelded Steel Pipe, F.O.B. Port Arthur:—

24-in. Pipe, 5/16-in. metal, Bell & Spigot joints, 40,200 lineal feet.

24-in. Pipe, 5/16-in. metal, flanged joints, 2,700 lineal feet.

24-in. Pipe, ¼-in. metal, flanged joints, 2,700 lineal feet (Alternative)

12-in. Pipe, 3/16-in. metal, Bell & Spigot joints, [illegible]

Also specials and flexible joints for the above, as per list furnished with the specifications.

Specifications can be seen at the office of the Contract Record and Engineering Review, Toronto, or the office of the City Engineer, Port Arthur.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur.
December 28th, 1912. 1-5

CITY OF MOOSE JAW,
SASKATCHEWAN

Tenders for Electrical Machinery

Sealed tenders marked "Tenders for turbo-generator" will be received by the City Commissioners, Moose Jaw, Sask., up to 12 o'clock noon on **Monday, February 10th, 1913**, for the manufacture, supply, delivery and erection of one 1,500 kw. steam turbine and generator.

Specifications and general conditions may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw; The Commercial Intelligence Branch, Board of Trade, 73 Basinhall street or London Chamber of Commerce, London, England.

The lowest or any tender not necessarily accepted.

A. W. MAYBERY,
L. W. RUNDLETT, Commissioners.
W. F. HEAL,

2-4

PROVINCE OF QUEBEC

Department of Roads
QUEBEC

Sealed tenders, addressed to the undersigned, and endorsed "Tenders," will be received at this office until 4 p.m. on **Monday, January 27th, 1913**, for:

1.—Grading of about 155 miles of road between Saint Augustin, Co. Portneuf, and Charlemagne, Co. L'Assomption.

2.—Construction of culverts and small bridges on the same road.

3.—Paving of about 30 miles of road in macadam or concrete or bituminous macadam pavement between Charlemagne, Co. L'Assomption, and Berthier, Co. Berthier.

Each tender must be accompanied by an accepted cheque on a chartered bank payable to the order of the Honorable the Minister of Agriculture and Roads, equal to a certain amount of the tender, which will be forfeited if the persons tendering decline to enter into a contract when called upon to do so. If the tender be not accepted the cheque will be returned. The amount of such cheques, for each of the three items above mentioned is indicated in "Information for proposers." This information will be supplied on demand.

Tenders may be made for the three items or for any item separately.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signature, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

The Department does not bind itself to accept the lowest or any tender.

By order,

B. MICHAUD,
Deputy Minister of Roads.
Quebec December 24th, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department. 2-2

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

CITY OF REGINA

Regina Sewage Disposal Works

Sealed tenders will be received up to noon, **Friday, January 31st, 1913**, addressed to the City Commissioners, for the supply of 37,700 square feet of galvanized iron sheeting etc.

The right to reject any or all tenders or to waive irregularities therein is to be at the discretion of the city authorities.

Plans, specifications, and all information may be obtained on application to the Chief Engineer, Trunk Sewer Works, Regina, Sask.

J. M. MacKAY,
2 Chief Engineer.

Sealed tenders addressed to the undersigned, and endorsed "Tender for Armoury, Port Arthur, Ont.," will be received at this office until 4 p.m. on **Wednesday, January 22, 1913**, for the construction of the building mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of the City Clerk at Port Arthur, Ont.; at the office of H. E. Matthews, Esq., Superintending Architect of the Dominion Public Buildings, Winnipeg, Man., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and places of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.
Department of Public Works,
Ottawa, December 27, 1912.

Newspapers will not be paid if this advertisement is inserted without the authority of the Department.—32702. 1-2

Tenders for Dredging

Sealed tenders, addressed to the undersigned, and endorsed "Tender for Dredging, False Creek, Vancouver," will be received until 4 p.m. on **Friday, January 31, 1913**, for dredging required at False Creek, Vancouver, B.C.

Tenders will not be considered unless made on the forms supplied, and signed with the actual signatures of tenderers.

Combined specification and form of tender can be obtained on application to the Secretary, Department of Public Works, Ottawa, and to C. C. Worsfold, Esq., District Engineer, New Westminster, B.C. Tenders must include the towing of the plant to and from the work. Dredges and tugs not owned and registered in Canada shall not be employed in the performance of the work contracted for. Contractors must be ready to begin work within thirty days after the date they have been notified of the acceptance of their tender.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, for five per cent. (5 p.c.) of the contract price, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 27, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—33298. 1-2

Sealed tenders addressed to the undersigned, and endorsed "Tender for Locks and Dam, Quebec Harbour, P.Q.," will be received at this office until 4 p.m. on **Monday, February 10, 1913**, for the construction of two Locks and Dam in Quebec Harbour, Que.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the offices of J. L. Michaud, Esq., District Engineer, Merchants Bank Building, St. James Street, Montreal; A. R. Decary, Esq., District Engineer, Post Office, Quebec; C. E. W. Dodwell, Esq., District Engineer, Halifax, N.S.; F. G. Goodspeed, Esq., District Engineer, St. John, N.B., and J. G. Sing, Esq., District Engineer, Confederation Life Building, Toronto, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to five per cent. (5 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December [illegible], 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—[illegible] 1-2

Sealed tenders addressed to the undersigned and endorsed "Tender for Public Building, Brantford, Ont.," will be received at this office until 4 p.m., on **Monday, February 3, 1913**, for the work mentioned.

Plans, specifications and form of contract can be seen and forms of tender obtained at the office of Mr. Thos. Hastings, Clerk of Works, Postal Station "F." Yonge Street, Toronto, at the Post Office, Brantford, Ont., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, January 3, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—31129. 2-3

Sealed tenders addressed to the undersigned, and endorsed "Tender for Construction of Two Steel Hopper Scows, 500 yards capacity each," will be received at this office until 4 p.m. on **Monday, January 27, 1913**, for the construction of two 500 cubic yards capacity Steel Hopper Scows.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the offices of T. H. Schwitzer, Esq., Mech. Superintendent Birks Building, Ottawa, Ont.; J. G. Sing, Esq., District Engineer, Confederation Life Building, Toronto, Ont.; Collectors of Customs at Kingston and Collingwood, Ont.; C. E. W. Dodwell, Esq., District Engineer, Halifax, N.S. and H. H. Donnelly, Esq., Supt. of Dredges, St. John, N.B.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, January 2, 1913.

Newspapers will not be paid if this advertisement is inserted without the authority of the Department.—[illegible] 2-3

City of New Westminster, B. C.

The Corporation invites tenders for a 3-yard clam shell dredge and for three 2-yard clam shell stiff-leg derricks.

Further information and specifications may be obtained from A. O. Powell, Harbor Engineer, Rooms 511-514 Westminster Trust Block, New Westminster, B.C.

Tenders will be delivered to the undersigned, on or before 5 p.m., **January 20th, 1913**.

The lowest or any tender not necessarily accepted.

W. A. DUNCAN, City Clerk.
City Hall, Dec. 31, 1912. 2-2

City of New Westminster, B. C.

The Corporation invites tenders for the construction of four wooden scows, 38 feet by 100 feet by 8½ feet.

Further information and specification may be obtained from A. O. Powell, Harbor Engineer, Rooms 511-514 Westminster Trust Block, New Westminster, B.C.

Tenders will be delivered to the undersigned on or before 5 p.m. **January 20th, 1913**.

The lowest or any tender not necessarily accepted.

W. A. DUNCAN, City Clerk.
City Hall, Dec. 31, 1912. 2-2

City of New Westminster, B. C.

The Corporation invites tenders for a steam tug, new or second hand.

Further particulars and specification may be obtained from A. O. Powell, Harbor Engineer, Rooms 511-514 Westminster Trust Block, New Westminster, B.C.

Tenders will be delivered to the undersigned, on or before 5 p.m., **January 20th, 1913**.

The lowest or any tender not necessarily accepted.

W. A. DUNCAN, City Clerk.
City Hall, Dec. 31, 1912. 2-2

Extension of Time

Notice is hereby given that the time for the reception of tenders for the Construction of a Wharf or Retaining Wall, at Hamilton, Ont., is extended to **Friday, January 10th, 1913**.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, December 30, 1912. 1

Boilers Wanted

WANTED—[illegible] Locomotive, 15 to 25 h.p.; also steam drills, concrete [illegible] Apply Box [illegible] Contract Record, Toronto, Ont. 2

Harris Excavator

[illegible] 18 [illegible] ft. Orange-peel Bucket, capable of digging to a depth of 20 feet. In good working order. Machine at present located in Montreal. Box 674 Contract Record, Toronto, Ont. 1-2

A large American [illegible] desirable connections with a good reliable contractors' supply firm to handle their line of Con[illegible] well known and has a good sale in Canada. Apply with full particulars to E. J. MacIntyre, 4059 [illegible]

To Contractors

[illegible] Work." [illegible] room of [illegible] and electric [illegible] Veterinary Col[illegible] and University [illegible] [illegible] and [illegible] Building [illegible] for the Blind, Brantford. Plans [illegible] and all informa[illegible] Public Works [illegible]

[illegible] to the [illegible] Hon. J. O. Reaume, Minister of Pub[illegible] amount of [illegible] and the bona-fide signatures and ad[illegible] two securities, or the bond of a guar[illegible] company, approved by the Department, [illegible]

[illegible] to accept [illegible]

By order,

H. F. McNAUGHTEN, Secretary.
Department of Public Works, Ontario.
Toronto, January 4, 1913.

Newspapers publishing this advertisement without authority will not be paid for it. 2-2

Situations Wanted

[illegible] and draughtsman, English, [illegible] h life experience in the design and [illegible] ng of locomotive and derrick cranes, [illegible] contractors' plant, seeks situation. Apply to Box 675, Contract Record, Toronto, Ont. 1 2

Situations Vacant

General Manager Wanted At Once

[illegible] street and [illegible] nts. Must be reliable and have [illegible] ability. High salary will be [illegible] ght party filling above requirements. [illegible] ations strictly confidential. Apply 119 [illegible] l of Trade, Montreal. 2-2

City Engineer Wanted

Applications for the position of City Engineer for the City of Ottawa, addressed to the Board of Control, will be received by the undersigned until 4 o'clock p.m. of **Friday, the 10th of January, 1913.** Applications to state qualifications and salary expected.

JOHN HENDERSON,
City Clerk.
Ottawa, December 20, 1912. 52-2

Water Works Engineer Wanted

Applications for the position of Water Works Engineer for the City of Ottawa, addressed to the Chairman of the Water Works Committee, will be received by the undersigned, up to 4 o'clock p.m. of **Friday, the 10th of January, 1913.** [illegible]ations to state qualifications and salary [illegible]ted.

JOHN HENDERSON,
City Clerk.

Business Buildings and Industrial Plants

(Continued from page 67)

Dufferin avenue. Architects, Cox & Amos, 112 Mansfield street, Montreal. General contractors, D. G. Loomis & Sons, St. Gabriel street. Iron and steel, Jenckes Machine Co 4-sty., 50 x 70, brick and stone construction.

Walkerville, Ont.
Garage and factory, cost $18,000, Kildare road, for George Reid. Architects, Leybourne & Whitney, Davis Block, Sandwich street east. General contractor, H. Howe, Cataraqui and Devonshire streets. Freight elevator, H. Kissans. 3 storeys, 119 ft. 3 in. x 50 ft., concrete foundation, brick, stone, concrete and steel construction.

Winnipeg, Man.
Garage to cost $10,000, Midland St., for The Canadian Fairbanks-Morse Co., Princess and Henry streets. Architects & general contractors, Geo. H. Archibald & Co., 803 Union Bank Bldg. 1-sty. 50 x 120, brick construction and foundation. Excavation started.

Residences

Montreal, Que.
Residence to cost $15,000 for Adolphe Lebeau, 773 B Henri Julien. 3-sty., 50 x 50, stone foundation, brick construction. Plans ready.

Residence to cost $14,000 planned for Jeanne Limoges, 2605 Mance street. 3-sty., 50 x 70, cement foundation, brick construction. Foundations in.

Residences to cost $63,000 for H. Plante, 1087 Labelle street. 3-sty., 20 x 77 ft. 6 in., cement foundation, pressed brick construction, felt and gravel roofing. Plans ready.

Toronto, Ont.
Residence, cost $2,800, 151 Sackville St., for Isaac Rohet, 83 Agnes street. Architect, E. S. Butler, 43 Adelaide street. Stone foundation, brick construction. Plans drawn.

Residence to cost $4,000, Rusholm Pk. Cres., for A. M. Roberts, 683 Gladstone avenue. Brick construction, stone foundation. Plans drawn.

7 pair residences to cost $28,000, Browning avenue near Logan. Owner and builder, J. M. Walker, 721 Carlaw avenue. Brick construction, stone foundation, shingle, felt and gravel roofing. Plans drawn.

Walton, Ont.
Residence to cost $3,200 planned for Enoch Clark. 1½-stys., brick vonstruction. Work to start in spring.

CONTRACTS AWARDED

Aylmer, Ont.
Residence to cost $4,000, Centre street, for J. Arthur Gillett, John street. Architect, J. F. Findlay, 386 Talbot street, St. Thomas. General contractors, C. A. Price & Son, John street, Aylmer. Heating, plumbing, electric work not let.

Brantford, Ont.
Addition to residence to cost $3,000, Brant avenue, for John Hewitt. Builder, Jesse Bartle, 172 Darling street. 2-sty., 18 x 27, brick clay construction, cement foundation.

Hamilton, Ont.
Residence to cost $2,500, Regent, for W. W. Peacock, 55 Market Hall. Architect, Robert Clochey, 266 John St. S. Contractor, E. C. Michell, 20 Sherman avenue. 2½-sty., pressed and stock brick veneer construction, stone and cement foundation.

Residence (Dumas). Owner and builder, Adelard Darancian, 10 Jacques Hartel street. 2-sty., 25 x 25, brick, cement foundation, felt and gravel roofing. Foundations in.

Residence to cost $6,000. Owner and builder, Danat Savard, 535 Ontario St. 2-sty., 36 x 72, brick, cement foundation. Foundations in.

Residence (St. Hubert) for Lucria Derome, 394 Defleurimont street. Builder, A. Morrisey, 394 Defleurimont St. 2-sty., 25 x 25, brick, stone foundation.

Residence to cost $3,000, Chapleau. Owner and builder, Jos. Allard, 156 Chapleau. 2-sty., 25 x 40, brick, cement foundation. Foundations in.

Toronto, Ont.
Residence, Bertmount ave. Owner and builder, Thos. Edmonds, 139 Symington ave. Two and a half storeys, brick construction, stone foundation.

Residence to cost $13,000, Russell Hill road, for Capt. Russell Hale, 11 Lower Union street, Kingston, Ont. Architect, Chadwick & Beckett, 18 Toronto street. Mason, Teagle & Son, 55 Boswell Ave. Brick and tile construction, brick foundation.

Residence to cost $3,000. Architect and builder, C. J. Pool, 2 Kingswood road. 2-sty., Roman stone construction, cement foundation.

Residence to cost $4,900. Architect and builder, Jno. Meldrum, 1296 Lansdowne avenue. 2-sty., brick construction. Foundations in.

Residence. Architect and builder, W. B. Reid, 6 Dunedin avenue. 2-sty., 16 x 36, hollow and roughcast construction, brick foundation. Plans drawn.

Vancouver, B.C.
Residence to cost $8,800, Balfour Ave., for W. B. Cooke. Architect, G. P. Bowie, 602 Hastings street west. General contractor, G. Chugg. 8 rooms, stone columns.

Apartments, cost $100,000, Georgia St., for T. Scott. Architect, Emil Guenther, North West Trust Bldg. Six storeys, 66 x 132, brick and mill construction. Tenders will be called at once.

Victoria, B.C.
Residence to cost $50,000 for Andrew Wright, 1006 St. Charles street. Architect, Philip M. Julien, 313 Arts & Crafts Bldg., Vancouver. General contractors, The B. C. Construction Co., 28 Flack Bldg. 2½-sty., 55 x 72, stone, stucco and frame construction.

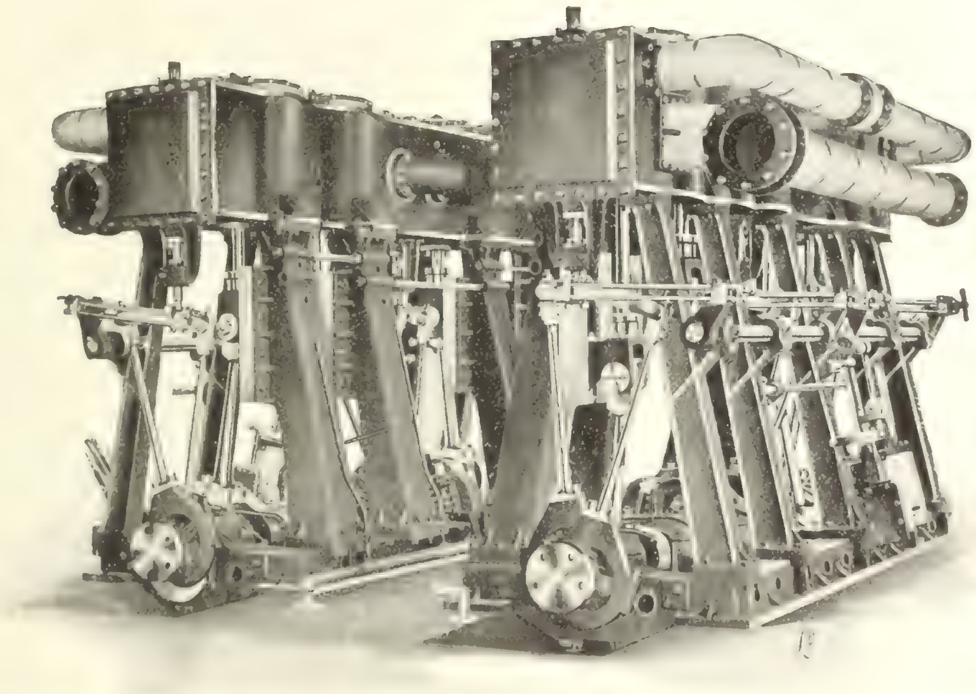
Power Plants, Electricity and Telephones

London, Ont.
Municipal telephone system contemplated by the city council. Clerk, Samuel Baker. Ald. Johnston will present plans and estimates to council at next meeting.

Montreal, Que.
Telephone exchange to cost $42,000, Outremont (Rockland avenue) for Bell Telephone Co. of Canada, Notre Dame and St. James streets, Montreal. Architect, W. J. Carmichael, Bell Telephone Bldg., Montreal. General contractor, E. G. M. Cape, 59 St. Peter street, Montreal. 2½-sty., 100 x 45, cut stone construction.

St. Catharines, Ont.
Extension transformer station to cost $40,000 for Niagara, St. Catharines & To-

ENGINES and BOILERS



Marine Engine built for the R. & O. Nav. Co.'s Steamer "Rapids Prince."

We make Boilers of every kind for any service. Engines, Pumping Machinery and heavy Plate work. "Inglis" indicates the best in Quality, Design and Workmanship.

Write us for particulars

The John Inglis Co., Limited

ENGINEERS AND BOILERMAKERS

14 Strachan Avenue Toronto, Canada

ronto Ry. Co. Gen. Mgr., E. F. Seixas, [illegible]. Engineer in charge, [illegible]. Purchasing agent, Rich[illegible]. [illegible] in progress.

St. Mary's, Ont.

Underground [illegible] extensions, planned by [illegible]. Secretary, Thos. M. Clark. In charge, Superintendent [illegible] has been instructed to prepare estimates for extending power lines, also to get figures on recording instruments [illegible] the peak load.

St. Johns, Que.

Lighting system in barracks to cost $4000. Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Engineer in charge, Capt. W. G. Tyrrell, [illegible] Shuter street, Montreal. Electric lighting, W. J. O'Leary & Co., 35 Recollect street, Montreal.

Miscellaneous

Calgary, Alta.

Street cleaning machinery contemplated by the City Council. Clerk, J. M. Miller. Engineer, J. T. Child. Mr. P. T. Richardson, 211 Ave. E. is interested in a [illegible] to clean the streets by vacuum machinery.

Delhi, Ont.

Fire protection system planned by town council. Further particulars from clerk, Roger Crysler.

Ottawa, Ont.

Five refrigerator cars, cost $11,500, for Dominion Government, Dept. of Railways & Canals (I.C.R.) General contractor, E. E. Armstrong, Falmouth, N.S.

Victoria, B.C.

Supplies for, 1913. Tenders received by Purchasing Agent W. Galt, until Jan. 27, 1912, for cordwood, coal, general hardware, brass goods, lead pipe, castings, hydrants, valves, sand and gravel, Portland cement lumber, cluster light globes, tungsten lamps, carbons, lubricating oils, coal oil, rubber hose, blasting logs. Specifications at office of purchasing agent.

Winnipeg, Man.

2 motor hose wagons to cost $11,165. Board of Control. Sec., M. Peterson. Fire Chief, J. E. Buchanan. Contracts were awarded to Darven Motor Truck Co. for one 60 h.p. 4 cyl. commercial car at $5,500; Boyce Carriage Co., 325 Elgin avenue, for one 60 h.p. 6 cyl. "Kissel Kar" at $5,665.

Sand dryer for asphalt plant 26 ft. long, 60 in. diameter to dry 20 tons of wet sand per hour. Specifications at office of engineer H. N. Ruttan, 223 James avenue. Tenders received by Sec. M. Peterson until Jan. 2, 1913.

30 fire alarm boxes. Fire Chief, J. E. Buchanan. Contractor, The Northern Electric & Mfg. Co., 599 Henry street, at $120 each. Board of Control. Sec., M. Peterson.

Business Notes

Arner, Ont.

Residence and barns of John Hunter burned; loss $4,800. Plans for new fireproof buildings will be prepared, to be ~~ereeted~~ in spring. Machinery was also destroyed.

Dauphin, Man.

Business Block, owned by T. T. Malcolm, Main street, destroyed by fire; loss $50,000. Three storeys, 100 ft. frontage, brick construction.

Delhi, Ont.

Business blocks owned by Ed. Morgan and Mrs. R. Stoddard burned. Buildings occupied by G. G. Byers, drugs and stationery ($5,000); Great North West Telegraph office; T. E. Morgan, general store, $14,000; H. T. Morgan, hardware and paint shop, $7,000; A. W. Crysler, $14,000; the Masonic Hall; E. Morgan, $10,000.

Montcalm, Que.

Club House of Quebec Hunt Club destroyed by fire; loss $20,000. To be rebuilt in spring.

Residence and stables of Mr. Chateauvent destroyed by fire; loss $25,000. To be rebuilt at once.

Mimico, Ont.

Residence (foot of Church street on Lake Shore road) owned by J. H. McKelvie burned. Loss $5,000 partly covered by insurance.

Montreal, Que.

Sash and door factory of Paul Demers, Van Horne and Waverley streets, burned; loss $50,000.

The O. K. Spice Company's factory, St. Denis street opposite Laval University, burned; loss $16,000. Prop., Messrs. Painchard & Tessier. The British American Film Co., who occupied room in same building, lost $2,500.

A. Richardson's grocery store at St. Laurent destroyed by fire; loss $5,000.

Sussex, N.B.

Business block owned by Geo. W. Fowler, M.P., destroyed by fire.

Sherkston, Ont.

Residence of David Shirk destroyed by fire. New building to be erected in spring. Brick or cement construction.

Winnippeg, Man.

The Manitoba Rolling Mills, St. Boniface. Buildings damaged by fire to extent of $200,000.

The Imperial Oil Co., Somerset Bldg., No. 1 warehouse on Logan avenue was completely destroyed by fire. Loss $50,000.

New Companies

Citizens Land Company, Limited, has been incorporated with a capital of $40,000 to carry on business as a land and building company, with head office at Toronto. The provisional directors are Harry Van W. Laughton, H. E. Redman and H. A. Clark, all barristers of Toronto.

Bonesteel and Handford, Limited, have been incorporated with a capital of $10,000 to carry on business as a general land and building company, with head office at Ingersoll, Ont. The provisional directors are T. E. Handford, gentleman, and D. A. Bonesteel, liveryman, of Ingersoll.

Federal Engineering Company, Limited, has been incorporated with a capital of $500,000 to carry on business as manufacturers and dealers in electrical machinery, appliances, plants &c., with head office at Toronto. The provisional directors are G. H. Kilmer, J. A. McAndrew and H. H. Davis, barristers, all of Toronto.

St. James Park, Limited, has been incorporated with a capital of $50,000 to carry on business as a land and building company, with head office at Hamilton. The provisional directors are O. D. Peat, L. F. Stephens and H. S. Lees, barristers, all of Hamilton, Ont.

The Globe Investment Company, Limited, has been incorporated with a capital stock of $500,000 to carry on business as a general land and building company, with head office at Montreal. The incorporators are Alex. Lacoste, T. J. Shallow, advocates, and J. E. Cote, accountant, of Montreal.

Pringle, Limited, incorporated with a capital stock of $20,000 to carry on business as electrical and mechanical engineers, with head office at Montreal. The incorporators are E. H. Godin, advocate, of Montreal, J. N. H. Mochon, electrician, and J. L. Girouard, notary, of Outremont, Que.

Quebec Structural, Limited, has been incorporated with a capital stock of $250,000 to carry on the business of bridge building in all its branches, with head office at Quebec. The incorporators are L. H. Gaudry, manufacturer, Arthur Picard, master plumber, and C. E. Teschereau, notary public, all of Quebec.

Recollect Land Company, Limited, has been incorporated with a capital stock of $50,000 to carry on business as a land and building company, with head office at Montreal. The incorporators are W. K. McKeown, advocate, E. A. Barnard and J. R. Law, accountants, all of Montreal.

Atlas Realties, Limited, have been incorporated with a capital stock of $50,000 to carry on business as a real estate and building company, with head office at Montreal. The incorporators are C. A. Hale, advocate, F. J. Laverty, K.C., and J. W. Blair, advocate, all of Montreal.

Mount Royal Brick Company, Limited, has been incorporated with a capital stock of $1,500,000 to carry on business as brick and terra cotta manufacturers, &c., with head office at Montreal. The incorporators are W. K. McKeown, E. A. Barnard and J. R. Law, of Montreal.

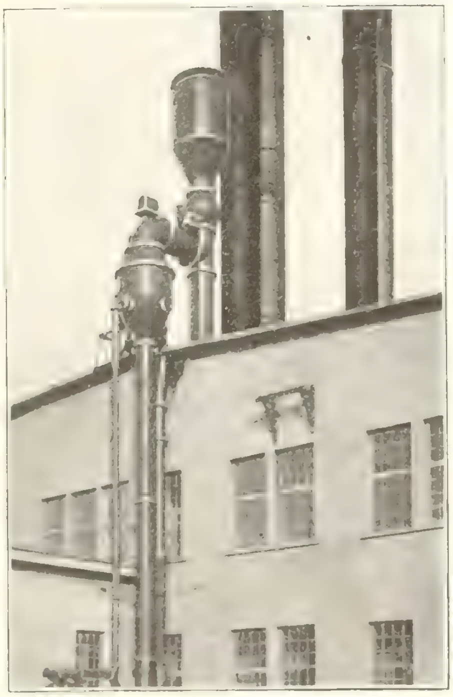
R. F. Green, Limited, has been incorporated with a capital of $40,000 to manufacture and deal in metal weatherstrip and builders supplies, with head office at Toronto. The provisional directors are R. F. Green, manager, C. W. Carruthers and C. P. Plaxton, law students, all of Toronto.

Bronte Heights Limited, have been incorporated with a capital of $40,000 to carry on business as a general land and building company, with head office at Hamilton. The provisional directors are H. D. Petrie, barrister, J. K. Smith, builder, Hugh McReynolds, estate broker, all of Hamilton.

Martin International Trap Rock Company, Limited, has been incorporated with a capital of $600,000 to quarry and manufacture all kinds of stone, with head offices at Bruce Mines. The provisional directors are S. B. Martin, contractor, Otto Fowle, banker of Sault Ste. Marie, Mich., and Dr. Kenneth Campbell of Bruce Mines, Ont.

BAROMETRIC CONDENSERS

PROPERLY DESIGNED
TO EFFECT
SAVING OF STEAM



The John McDougall
Caledonian Iron Works Co., Limited

Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery, Pumps, centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants.

Works: Seigneurs & William Sts., MONTREAL
Sales Offices: MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

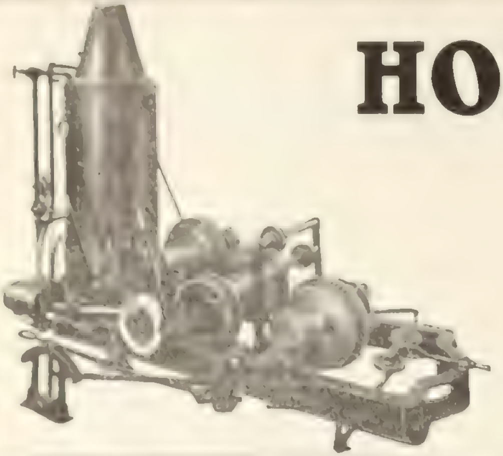
Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, ***General Sales Agent***
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers



HOISTING ENGINES

Some of the strongest friends of the M. & H. Hoists are to be found among the men who have owned and used them. For instance the following written by one of the Lumber Kings of Canada a man who telegraphed us an unsolicited order for another hoist not long ago.

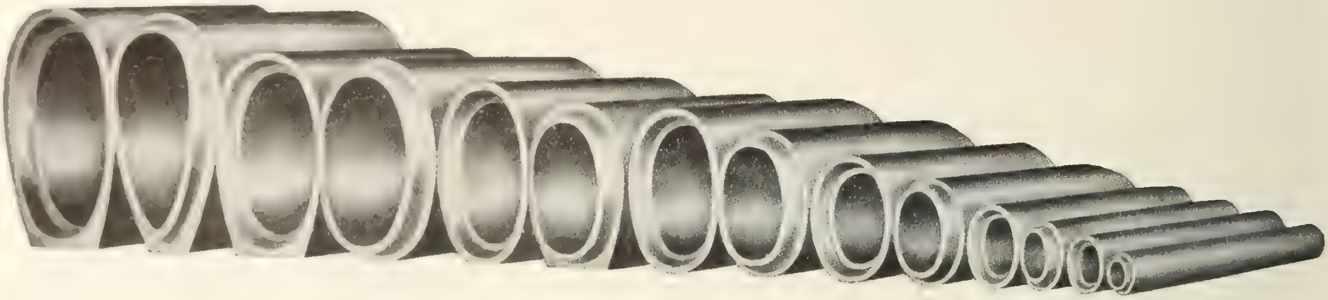
"Answering your enquiry, I am pleased to state that the hoists with which you supplied me some years ago have given good satisfaction and have been in pretty constant use ever since.

No other Hoist in Canada has so many practical improvements as the M. & H. Hoist for 1912. Let us tell you about them.

Marsh & Henthorn, Limited

Sales Agents: MUSSENS Limited, Montreal

Belleville, Ontario



Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS.
NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

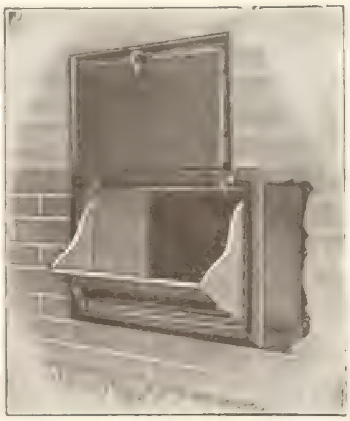
STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario



EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

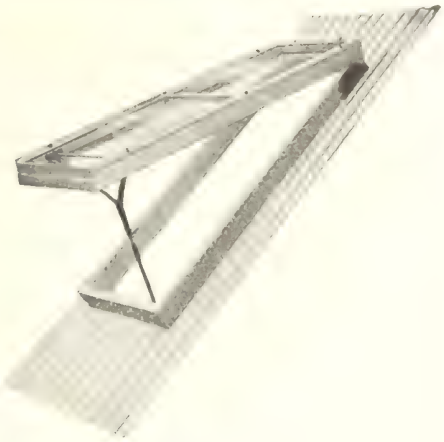
Galt, Ontario, Can.

Montreal Representative: E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

Roof Ornaments and Weather Vanes

Made specially in wrought iron or copper from Architects or our own designs

Dennis Wire & Iron Works Co. Limited
London, Ont.
Toronto Branch : 36 LOMBARD STREET



Cheap
and
Practical

The New Skylight
Acheson
Barn Roof Lights

attached like an ordinary sheet of corrugated iron —no soldering nor flashing. Moveable or stationary sash, plain or wired glass. Made for corrugated iron or any other form of roofing.

Write for prices and full particulars

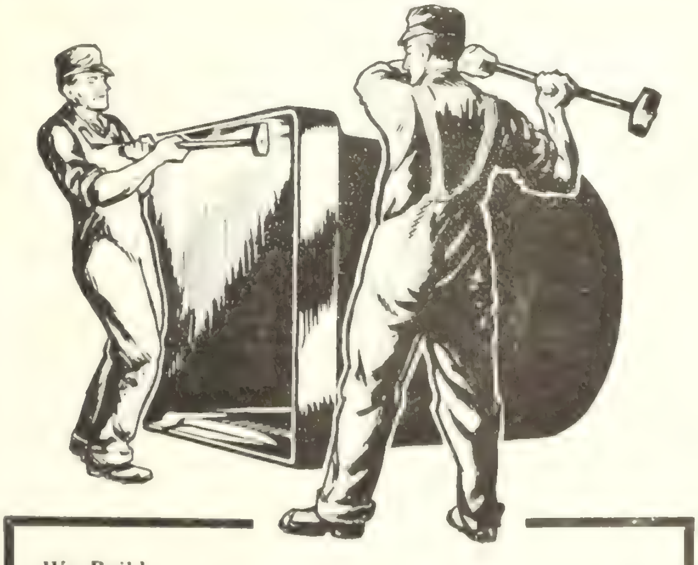
The Metallic Roofing Co. LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.

Tenders Wanted

should be advertised for in the "Tenders and For Sale Department" of the CONTRACT RECORD AND ENGINEERING REVIEW. This paper is the "Tender Ad." medium of Canada and always brings bids from the reliable contractors and supply houses.

File your plans for any work on which you are inviting bids, in our offices at Toronto, Montreal, Winnipeg or Vancouver.

Contract Record
and Engineering Review
Toronto · Ontario



We Build
Steel Plate Work

[illegible] done right, [illegible]

[illegible]

The Waterous Engine Works Co., Ltd.
BRANTFORD CANADA

THE TEST

The first Creosoted Wood Block Pavement laid in America was on Tremont Street, Boston, Massachusetts, twelve years ago.

This pavement was laid to secure a test of the wearing qualities of Wood Block.

The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

The Asphalt was taken up some time ago and street newly paved.

The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

The Dominion Creosoting Co., Ltd.
Vancouver, B. C.

BEATTY HOISTS

STEAM OR ELECTRIC

Derrick Car placing 100 foot Deck Plate Girder Span in Missinabi River Bridge on the Transcontinental Railway. The Hamilton Bridge Works Co. together with many other prominent firms favor "Beatty Hoists" for this exacting work.

You cannot see the Hoisting Engine in the picture but it is there, ready at all times and equal to any work it is called upon to do.

This accounts for our receiving the larger portion of orders for engines used on this class of work.

We are equally well able to furnish YOU a Hoist fitted for YOUR individual needs.

May we send you new descriptive matter covering our Engines and Buckets, etc. We'll be glad of the chance.

M. Beatty & Sons
Limited
Welland, Canada

AGENTS
E. Leonard & Sons, St. John, N. B., Calgary Alta
H. E. Plant, 1790 St. James St., Montreal, Que.
H. W. Petrie, Limited, Toronto, Ont.
Dominion Equipment & Supply Co., Winnipeg, Man.
R. Hamilton & Co., Vancouver, B. C.

Block Stone, Dimensions, Random, Head Sills, Shoddy, Stone Sawing

Sackville Freestone Co., Limited, Sackville, N. B.

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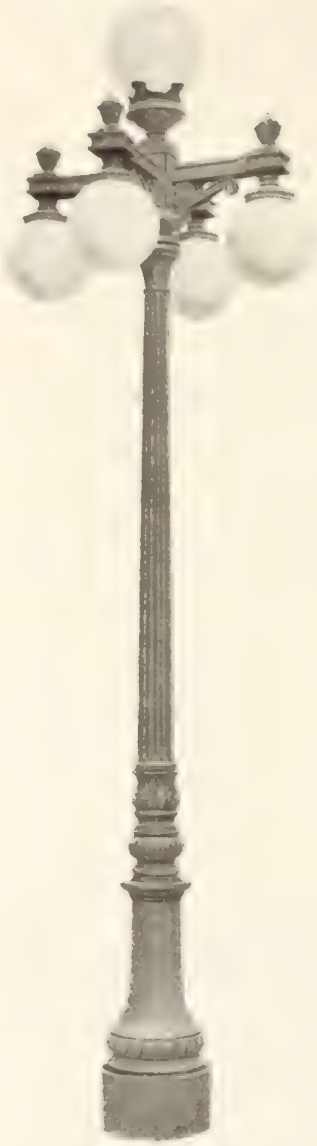
MORRIS
Street Lighting Poles



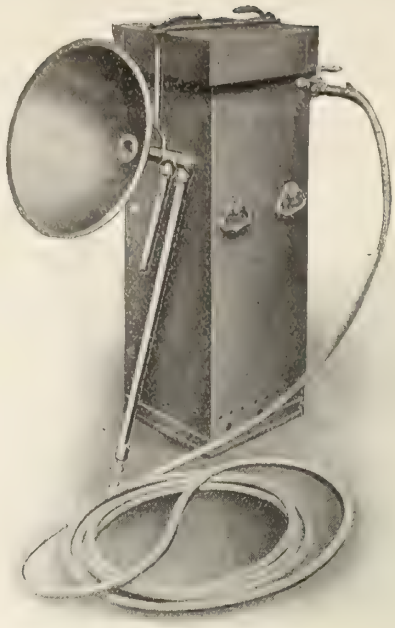
Modern Ideas In Street Lighting

Send for Descriptive Bulletin and Prices

L. H. Gaudry & Co., Limited

Canadian Distributors

76 St. Peter St. - Quebec, Can.



5,000 to 12,000 Candle Power at 5 cents Per Hour

How is that for cost? Can you beat it with any other light? The Milburn Acetylene Light is cheaper than oil or arc lights and just as simple as gas in your own house.

The Milburn Light shown above has a 15-inch aluminum, non tarnishing reflector, with absolutely storm-proof burner on swing joint, and 25 feet of armored hose and connections. It has a water-tight cover and is made to withstand hard usage, the vibration and movement of wrecking cars, cranes, steam shovels, dredges, etc. The light follows the crane or shovel and throws its rays directly upon the work.

THE MILBURN LIGHT

is made by water and carbide, burns more than half air, and requires no attention during use. Most of the fittings are of standard sizes, obtainable anywhere. It lights instantly and is absolutely safe. Tens of thousands of these lights are in constant use by all classes of users and not a single accident has ever been reported. They are now being used on all kinds of construction work in all parts of the world. Up-to-date contractors swear by them. You had better get acquainted with the Milburn Light.

Ask for Catalog No. 15

The Canadian Fairbanks-Morse Company, Limited

Montreal St. John, N.B. Ottawa Toronto Winnipeg
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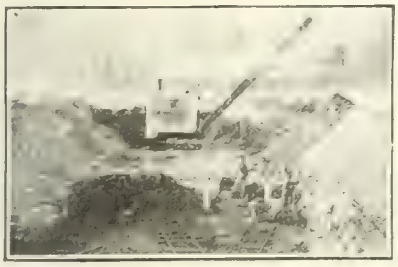

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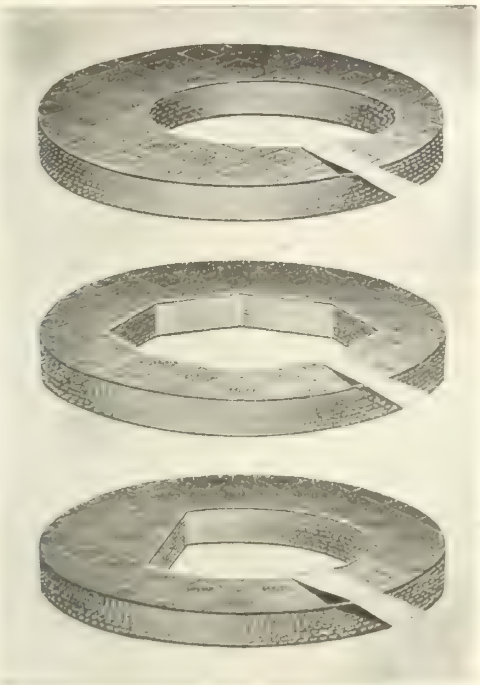

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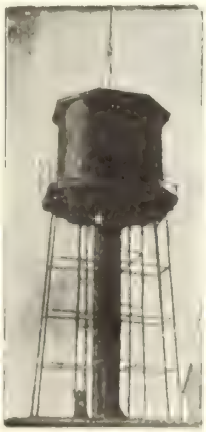

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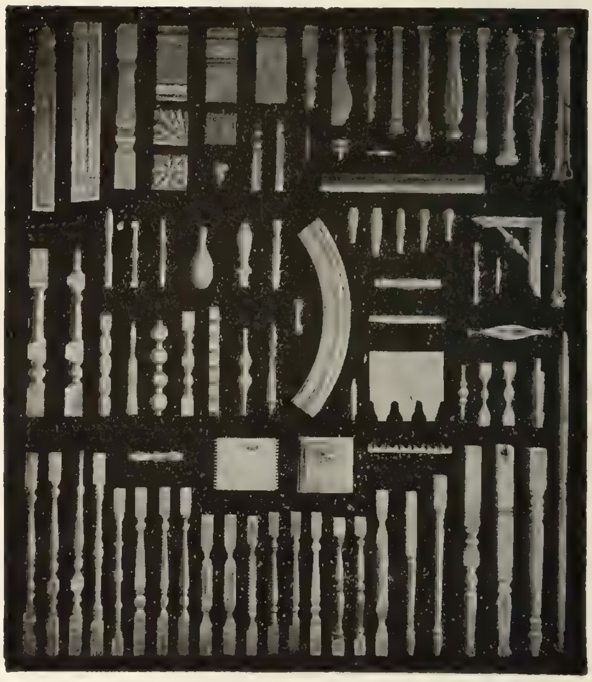

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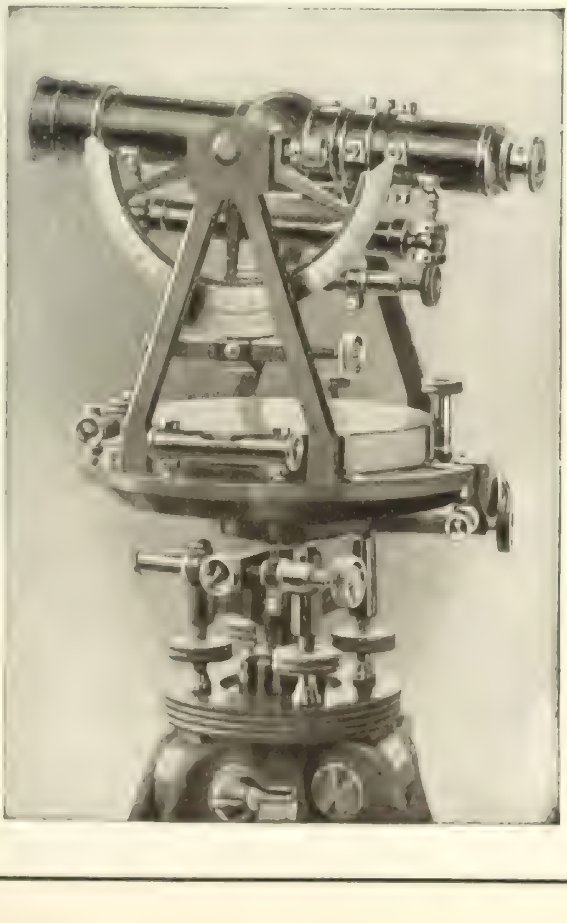

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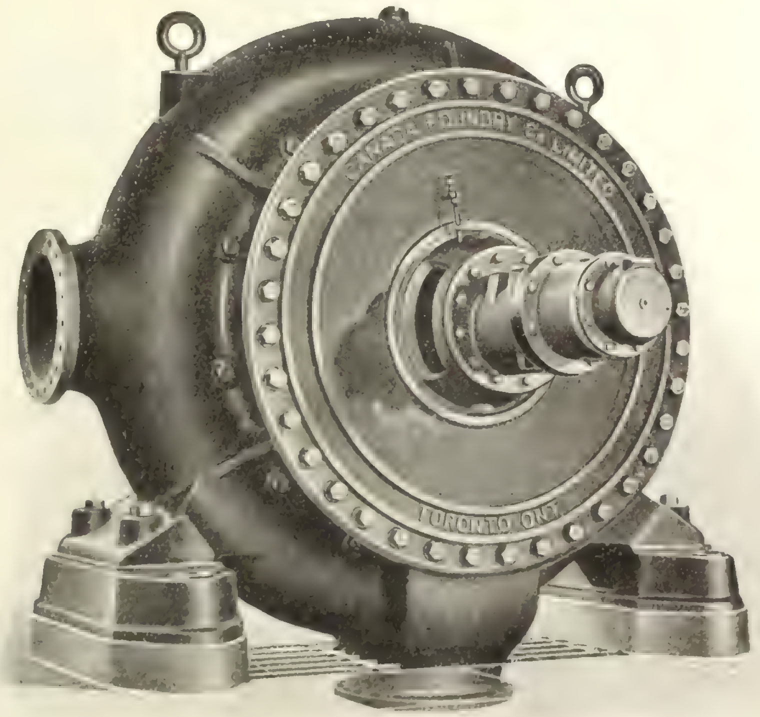

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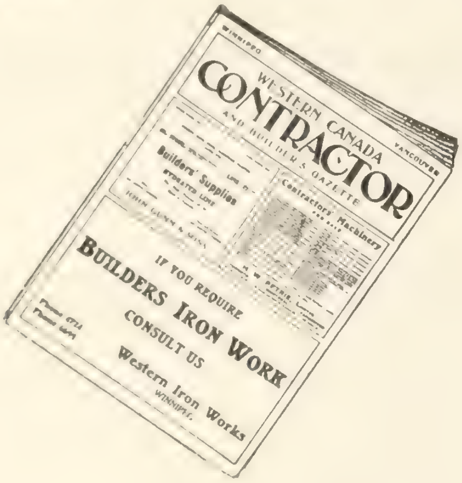

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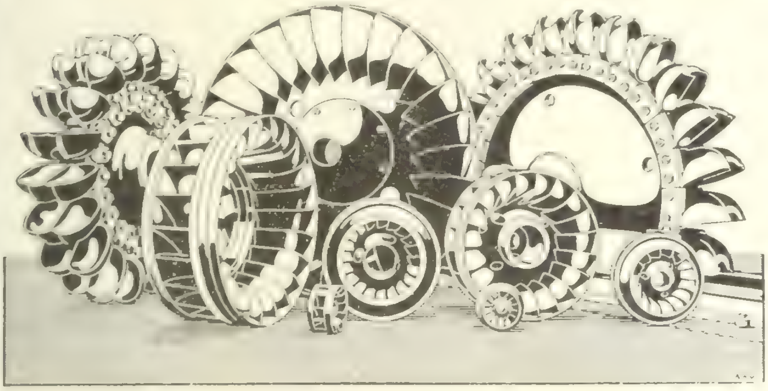

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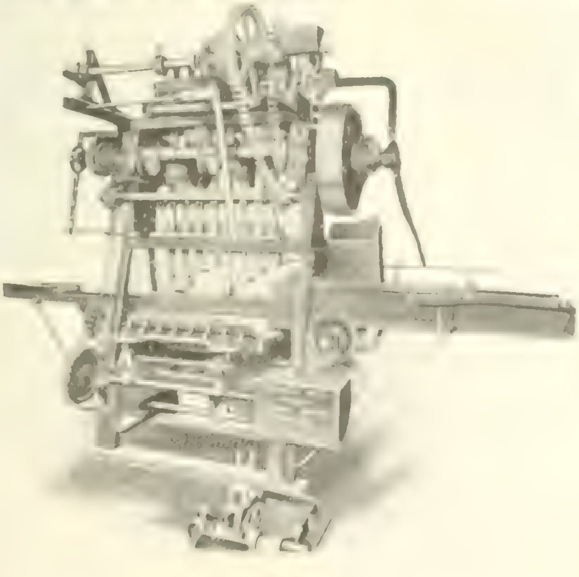

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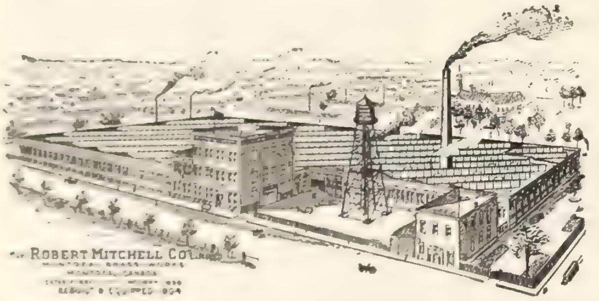
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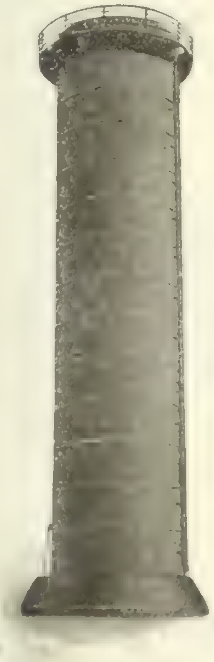

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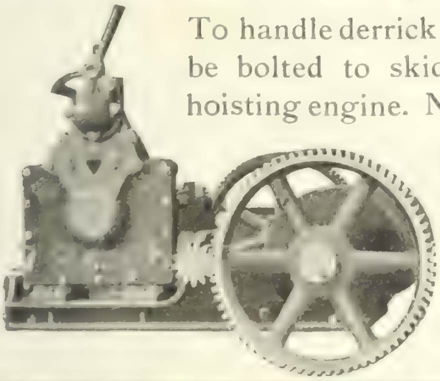

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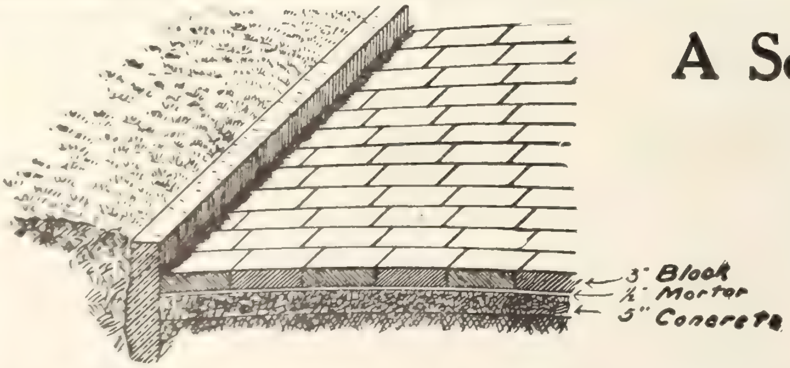

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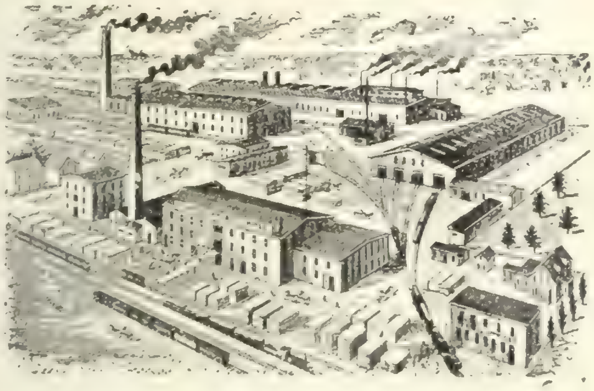

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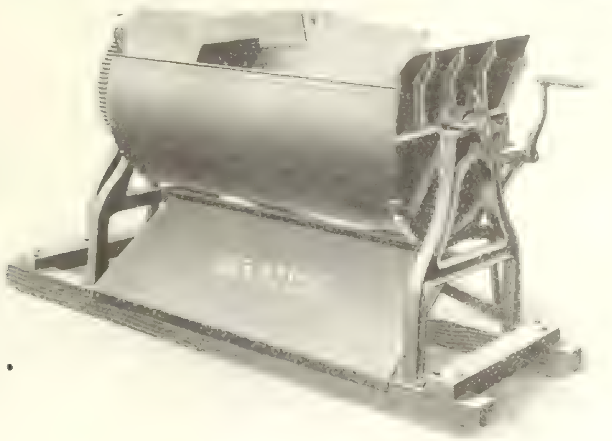

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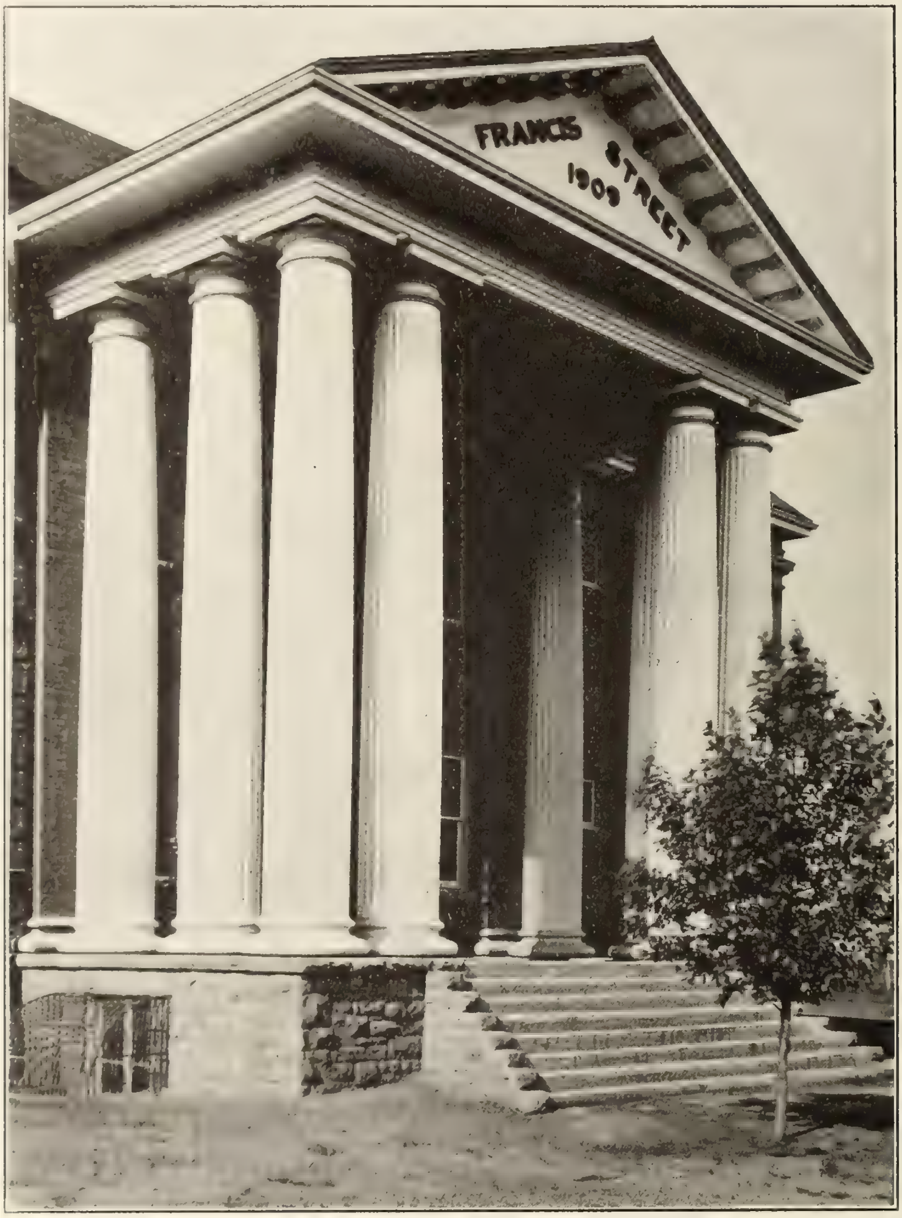

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	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock Lumber—

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving..	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

[illegible]

XXX B. C. Clear Shingles, per M.	[illegible]
N. B. Extras	[illegible] 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

Cedar Posts- Fence—

5 in. at small end, each	25
7 in. at small end, each	[illegible]
Hemlock lath	3 25

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Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	[illegible]	[illegible]
Up to 25 ut.	$3 50	$6 00
26 40	[illegible]	5 50
41 50	[illegible]	6 25
51 60	4 75	7 00
61 70		8 00
71 80		9 00
81 85		10 00
86 90		11 00
91 95		13 00
96 100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

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Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

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No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

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Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in. .. .	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

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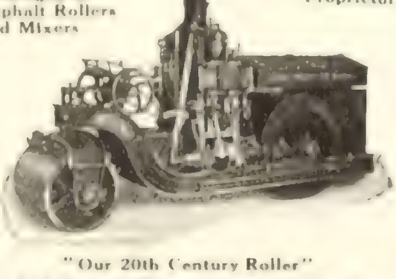

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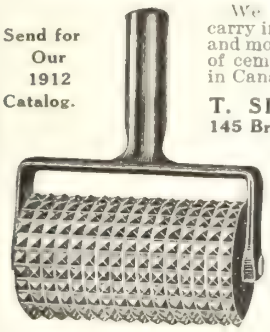

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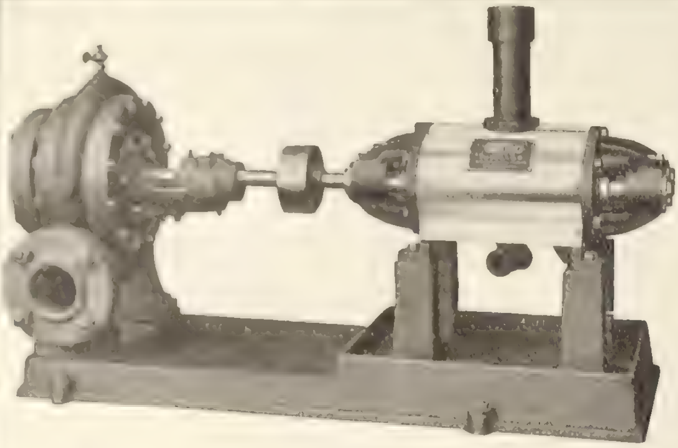

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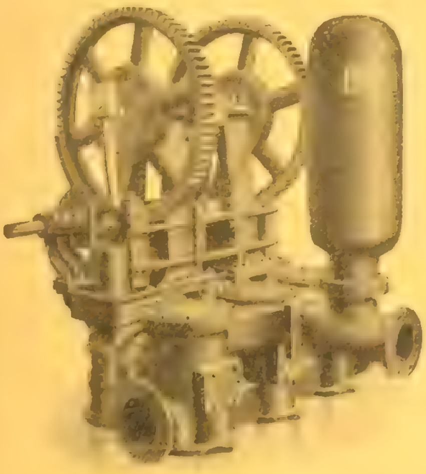
ESTABLISHED 1886

Contract Record and Engineering Review



Steam Pumps,
Vacuum Pumps,
Condensers
Triplex Power Pumps,
Duplex Power Pumps,
Centrifugal Pumps,
Travelling Cranes

The Smart-Turner Machine Co. LIMITED
HAMILTON, ONTARIO

"MADE IN CANADA"

Bent Glass

Made in all Kinds of Glass on Short Notice

Large Bent Plate Glass for Shop Fronts a Specialty

The Toronto Plate Glass Importing Company, Limited
(HILL & RUTHERFORD, Managing Directors)
Head Office and Works: 91 to 133 Don Roadway
TORONTO

Air Compressors
OF BELLISS MAKE
have gained their reputation for

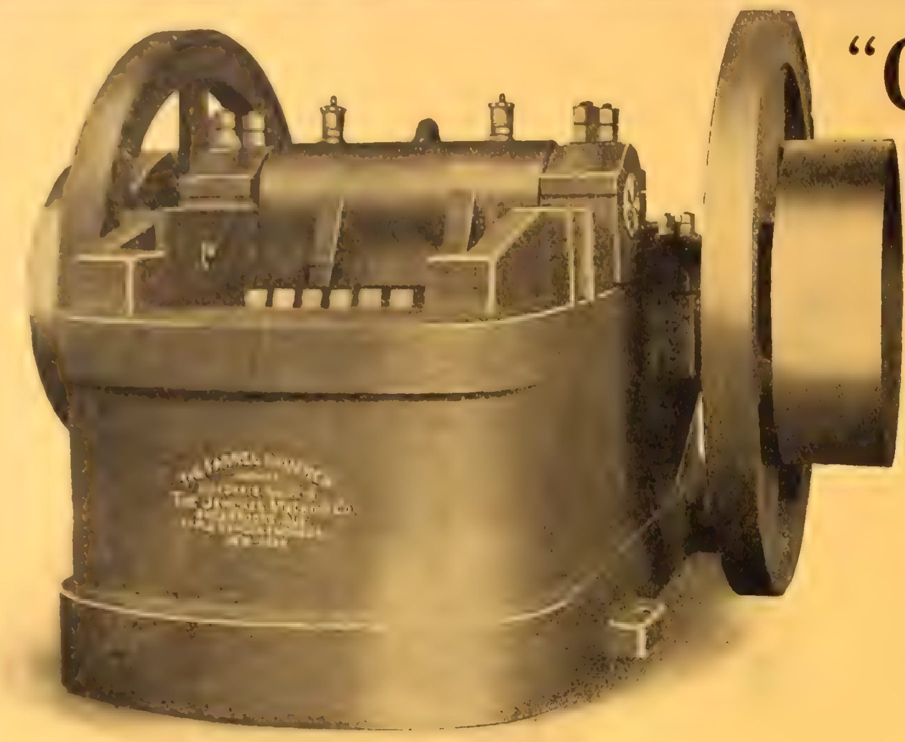
Simplicity of Design
Noiseless Running
Compact Design
Low Oil Consumption
Continuous Operation
Overall Efficiency

Messrs Belliss & Morcom, Ltd.
BIRMINGHAM, ENGLAND
Agents
Laurie & Lamb
Board of Trade Building, MONTREAL

Continuous and Machine Banded Wood Stave
WATER PIPE
RESERVOIR TANKS
for city and town Water Systems, Fire Protection, Power Plants, Hydraulic Mining, Irrigation, etc. One half the cost of Iron Pipe—and better.

Pacific Coast Pipe Co., Limited
P. O. Box 563 Vancouver, B. C.
Office and Factory, Granville St., near High Bridge
WRITE FOR CATALOGUE
Full Particulars and Estimates Furnished

Alphabetical Index of Advertisers, Page 16 Classified Directory to Advertisements, Page 6



"CRUSHERS"

Complete
Crushing Plants

Our Specialty

Many Years Experience and Exceptional Facilities

Ask for Copy of
New Catalogue

THE JENCKES MACHINE COMPANY, LIMITED

General Offices: Sherbrooke, Que. Works: Sherbrooke, Que. - St. Catharines, Ont.

Sales Offices:—Sherbrooke, Montreal, St. Catharines Cobalt, So. Porcupine, Vancouver Nelson

---

HERE'S A STANDARD "AMERICAN" WIRE ROPE BLOCK

Bigger and better than any other block made.

May we send you one for comparison with any block you have ever used or seen?

Send Coupon for Information and Prices

American Hoist & Derrick Co., St. Paul, Minn.
[illegible]
[illegible]

American Hoist & Derrick Company

St. Paul U. S. A.

Gorman, Clancey & Grindley	Edmonton and Calgary, Alta. and Nelson, B.C.
Vancouver Machinery Depot, Ltd.	Vancouver, B. C.
Stuart Machinery Co.	Winnipeg, Man.

Canada-wide Distribution!

When you, Mr. Engineer, plan a building—or when you Mr. Contractor, erect it—you are usually anxious to get it completed as soon as possible.

Delay in completion is certain to cause complaints and confusion—and is likely to cause financial loss.

Therefore, in selecting materials, it is to your advantage to specify the Cement made by the Company best equipped to supply your requirements quickly, for thus you reduce the danger of delayed delivery. The Canada Cement Company's mills—located at Exshaw, Calgary, Winnipeg, Port Colborne, Shallow Lake, Belleville, Marlbank, Lakefield, Hull and Montreal—are so placed as to provide the quickest possible delivery to any point in Canada.

WE HAVE CANADA-WIDE DISTRIBUTION

Quick delivery is an important point. Complete delivery of your whole order is even more important. Canada Cement mills have sufficient capacity to completely fill all orders promptly.

Write for "Factories and Warehouses of Concrete."
It will interest you. Enclose 12 cents in stamps for postage.

Canada Cement Company
Limited
No. 62 Herald Building - MONTREAL
Sales Offices: TORONTO - WINNIPEG - CALGARY

All the Latest Improvements
Are Included on
the NEW

MARSH & HENTHORN

HOISTING

ENGINES

STEAM - ELECTRIC - BELT

All Sizes

Standard Sizes
Carried in Stock

Special Outfits
Designed

Catalogue on
Request

Montreal, 318 St. James St.
Toronto, 155 West Richmond St.
Cobalt, opp. Right of Way Mine.

MUSSENS

THOSE

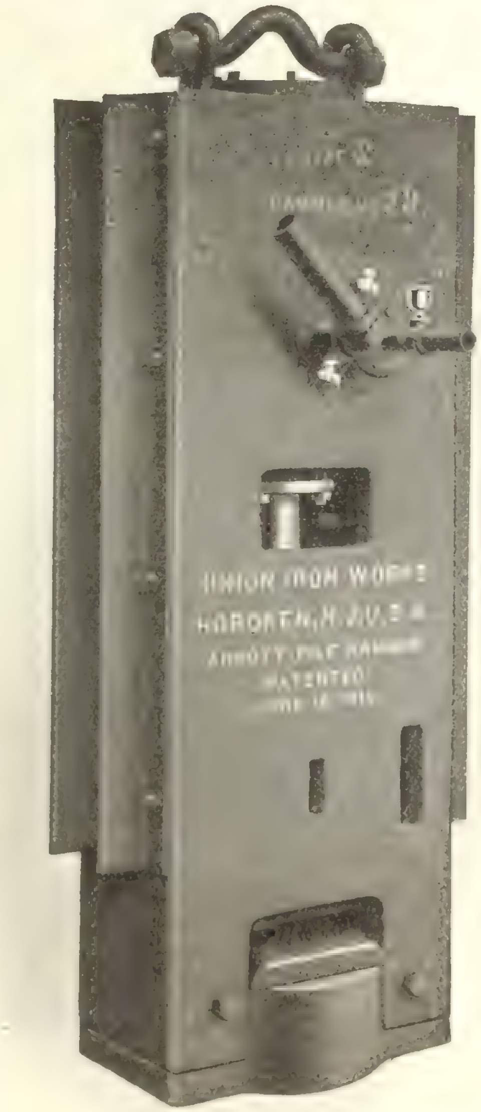
DRIVING PROBLEMS

We Strongly
Recommend The

Arnott Pile Driving Hammer

For Steam or Air

Double Acting Rapid Stroke For handling the heaviest Concrete Piles and Steel Sheeting as well as the lightest wood and Steel Sheeting. Its use means Greatest economy of steam or air and greatest convenience and results where head room is limited.



All its vital operating mechanism is protected from breakage.

9 Sizes 365 lbs. to 12 tons

LIMITED

Winnipeg, 259-261 Stanley St.
Calgary, 10th Ave. & 3rd St. E.
Vancouver, 365 Water Street

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The following regulations apply to all advertisers:—Eighth page, two headings; quarter page, four headings; half page, eight headings; full page, sixteen headings.

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- Canadian Fairbanks-Morse Co.
- Can. Ingersoll-Rand Co., Ltd.
- Escher Wyss & Co.
- Canada Foundry Co.

Architects
- [illegible]

Architects' Instruments
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- Ainsworth & Sons, Wm.

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- Canada Wire & Iron Goods Co.
- Dennis Wire & Iron Works
- Meadows Co., Geo. B.
- Steel & Radiation Ltd

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- Asbestos Mfg. Co.
- Chillas-Black, Ltd.
- Don Valley Brick Works
- Northwestern Terra-Cotta Co.
- Toronto Plate Glass Imp't'g Co.

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- Canadian Mineral Rubber Co.

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- General Supply Company
- Sawyer Belting Company

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- Canadian Buffalo Forge Co.
- Can. Ingersoll-Rand Co., Ltd.
- Douglas Milligan Co.
- Sheldons Limited
- Sturtevant Co. of Can. Ltd., B. F

Boilers
- Canadian Boving Co.
- Inglis, John
- Jenckes Machine Co.
- Leonard & Sons, E.
- Marsh & Henthorn
- McDougall Caledonian Iron Wks
- Mussens Limited
- Waterous Engine Works Co.

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- Standard Underground Cable Co. of Canada Limited

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- Linde British Refrigeration Co.

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- Hamilton Pressed Brick Co.
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- Douglas Milligan Co.
- Heinicke Co., H. R.

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- Bechtels Limited
- Canadian Buffalo Forge Co.

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- Canadian Bridge Co.
- Des Moines Bridge and Iron Co.
- Dickson Bridge Works
- Dominion Bridge Co.
- Hunter Bridge & Boiler Works
- Mackinnon-Holmes & Co.
- McNeil & Co., W. P.
- National Bridge Co.
- Phoenix Bridge & Iron Works
- Sarnia Bridge Co.
- Structural Steel Co.
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- American Hoist & Derrick Co.
- Browning Engineering Co.
- Canadian Fairbanks-Morse Co.
- Lecky & Collis
- Owen Bucket Company
- Thew Shovel Company

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- Factory Products
- Imperial Wire & Cable Co.
- Standard Underground Cable Co. of Canada, Limited

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- Morrison & Co., T. A.
- Rogers, Alfred Limited
- Smyth & Ryan

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- Slack, T.

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- Down Draft Furnace Co.

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- American Hoist & Derrick Co.
- Browning Engineering Co.
- Brown Hoisting Machinery Co.

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- Blystone Machinery Co.
- Canada Foundry Co.
- Chain Belt Company
- General Machinery Co.
- Hopkins & Co., F. H.
- Jenckes Machine Co.
- Koehring Machine Co.
- Lecky & Collis
- London Concrete Machinery Co.
- Mussens Limited
- Morrison & Co., T. A.
- Wettlaufer Bros.
- Woodstock Wind-Motor Co.

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- Can. H. W. Johns-Manville Co.
- Conduits Co., Limited

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- Eastern Pipe Construction Co.
- Foundation Co.
- McKnight Construction Co.

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- Billings Chapin Co.
- Cabot, Inc., Samuel

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- Sand and Supplies
- Smyth & Ryan

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- Hamilton Mfg. Co., Wm.
- Hopkins & Co., F. H.
- Jenckes Machine Co.
- Lecky & Collis
- London Concrete Machinery Co.
- Mussens Limited
- Morrison & Co., T. A.

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- American Hoist & Derrick Co.
- Hepburn, John T.

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- Beatty & Sons, M.
- Browning Engineering Co.

Drills
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- Canadian Buffalo Forge Co.
- Canada Foundry Co.
- Canadian Ingersoll-Rand Co.
- Lecky & Collis

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- Harvey, J.

Drill Steel Sharpeners
- Canadian Ingersoll-Rand Co.

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- Bechtels Limited
- General Supply Co.
- Smith Foundry Co.

Electric Air Rock Drills
- Canadian Ingersoll-Rand Co.

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- Engineering Works of Canada
- Factory Products
- Mitchell Co., Robt.

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- Canadian Boving Co.
- Canadian Buffalo Forge Co.
- Inglis, John
- Jenckes Machine Co.
- Laurie & Lamb
- Leonard & Sons, E.
- McDougall Caledonian Iron Wks.
- Mussens Limited
- Sturtevant Co. of Can. Ltd., B. F.
- Waterous Engine Works Co.

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- Barber & Young
- Bowman & Connor
- Campbell, R.
- Chipman & Power
- Farmer, John T.
- Galt Engineering Co., John
- Hancock, H. Syd.
- Inglis, John
- Kennedy, Jas. C.
- Kortring & Green
- Lea & Ferguson.
- Mitchell, C. H.
- Taylor, James
- Wood and Service

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- Star Expansion Bolt Co.

Expanded Metal
- Munderloh & Company

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- Estimators & Quantity Experts

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- Austin Drainage Excavator Co
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- Sheldons Limited
- Sturtevant Co. of Can. Ltd., B. F.

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- Buff & Buff Mfg. Co.
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- Gurley, W. & L. E.
- Watts & Son, E. R.

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- Canadian Mineral Rubber Co.

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- American Water Softener Co.

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- Bell Filtration Co.

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- Smyth & Ryan

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- Dahlstrom Mettalic Door Co.
- Mussens Limited
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- Lecky & Collis

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- Canadian Buffalo Forge Co.

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- Improved Equipment Co.

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- Improved Equipment Co.

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- Improved Equipment Co.

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- Toronto Plate Glass Imp't'g Co

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High Pressure Pipe Lines
- Canadian Boving Co.
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Hoisting Apparatus
- American Hoist & Derrick Co.
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- Beatty & Sons, M.
- Browning Engineering Co.
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- Doty Marine Engine & Boiler Co
- Erie Clutch & Pulley Co.
- Factory Products
- Inglis, John
- Jenckes Machine Co.
- Hopkins & Co., F. H.
- Lecky & Collis
- Marsh & Henthorn
- Mussens Limited
- Royce Limited
- Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
- Canadian Fairbanks-Morse Co.

Horse Stable Fittings
- Beatty Bros.

Hydrants
- Canada Iron Corporation
- Gartshore-Thomson Pipe Co.
- Kerr Engine Co.

(Continued on page 12)

Don Valley Products

New Residence for Lieutenant Governor of Ontario, Toronto. Provincial Architect Heakes, Architect. Don Valley Brick and Porous Terra Cotta used throughout.

Don Valley Bricks

are used in the construction of the most important public buildings erected by the Provincial Government. They are specified by the leading architects for every building of importance. The latest example of the public recognition of their superiority is found in their use for the new Toronto Residence of the Lieutenant Governor of Ontario. Don Valley Bricks possess a beauty of color and an even texture and form which add that touch of distinction to a building that characterises it as fulfilling the essentials of decorative dignity.

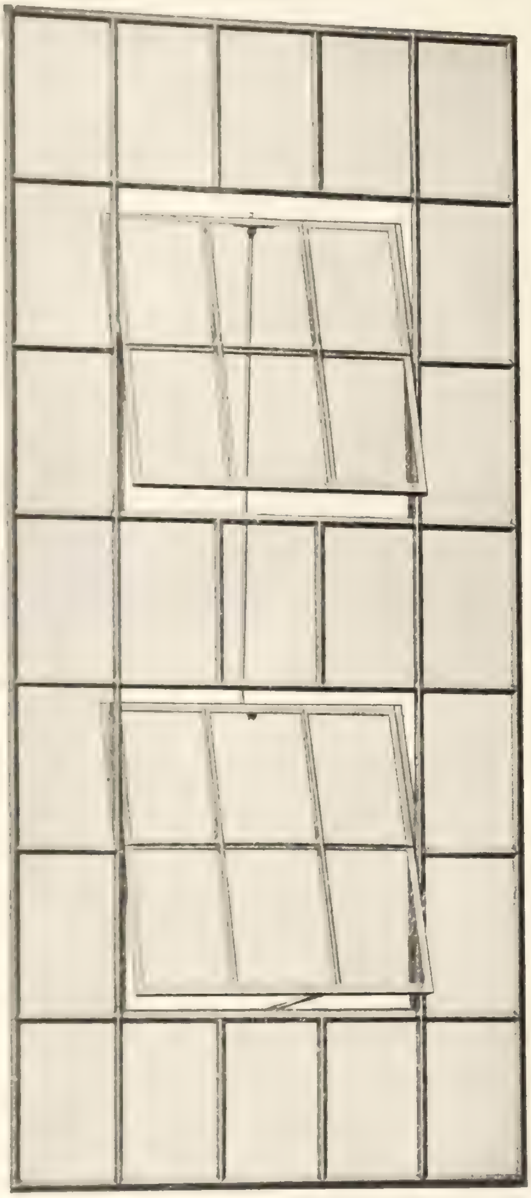
Don Valley Hollow Tile Fireproofing is absolutely dependable for that structural strength necessary to resist the action of age or any other deteriorating influence. For many years its success as a staple and fireproof building material has been established in hundreds of practical tests in buildings throughout the country.

"SPECIFY DON VALLEY PRODUCTS"

THE DON VALLEY BRICK WORKS

Head Office: 36 Toronto St., TORONTO
Montreal Agent: **David McGill, 83 Bleury Street**

LET IN THE LIGHT



"Fenestra"

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,
Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

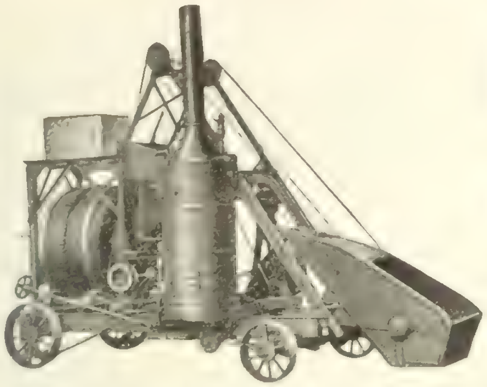
proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons
Railroad Shops, Warehouses, Barracks, etc.

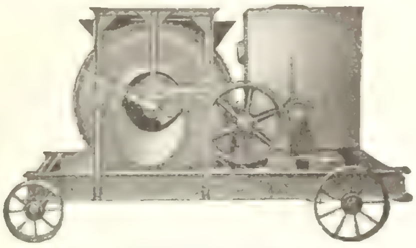
We will help you to settle the problem of your window requirements—write us.

STEEL and RADIATION, Limited

TORONTO, CANADA

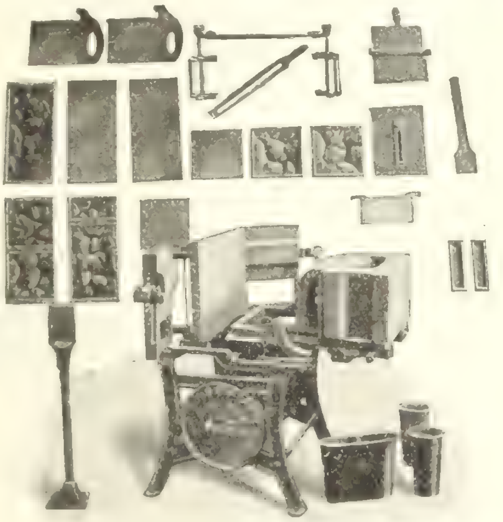

London Paving Machine with Front Loader

London Concrete Machinery is built up to a standard.


London Standard Batch Mixer with Charging Bin, Gasoline Power

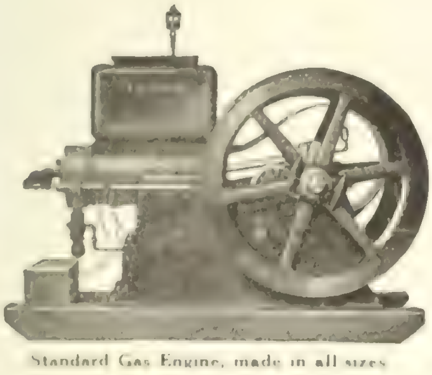
CONTRACTORS—It is worth something to you to know that when you use the LONDON MACHINES you have an equipment which is not a back number.

All OUR MACHINES are built by up-to-date METHODS and by the MANY NEW and IMPROVED FEATURES of the LONDON MACHINES place them in A CLASS by themselves.


London Face Down Concrete Block Machine

We are saving the Contractor money in the COST OF MACHINE, COST OF OPERATING, COST OF MAINTENANCE, everything made in our own shops. We sell direct to the contractor.

We are the only large Canadian Firm who specialize on Concrete Machinery.

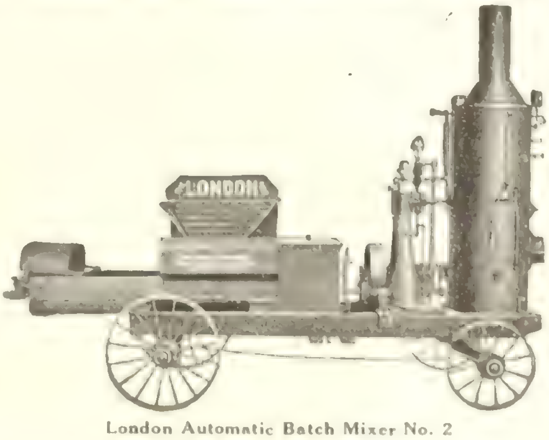

Standard Gas Engine, made in all sizes

Send for

1912

Catalogue

stating LINE interested in. We manufacture a full line of Concrete Machinery and Cement Working Tools.



London Automatic Batch Mixer No. 2

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, (106 Pleasant St.) G. B. Oland, Mgr

AGENCIES:

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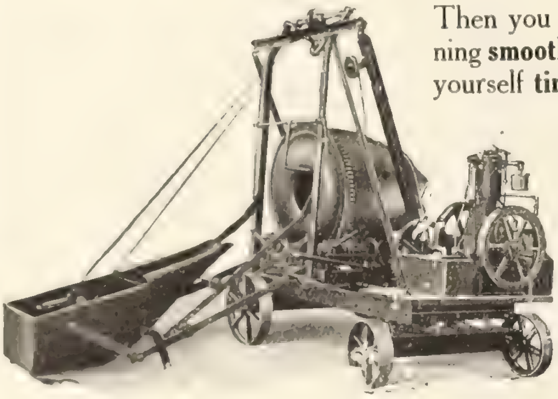
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng. & Supply Co
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

CONTRACTORS!!

Avoid All Delay on Your Concrete Work

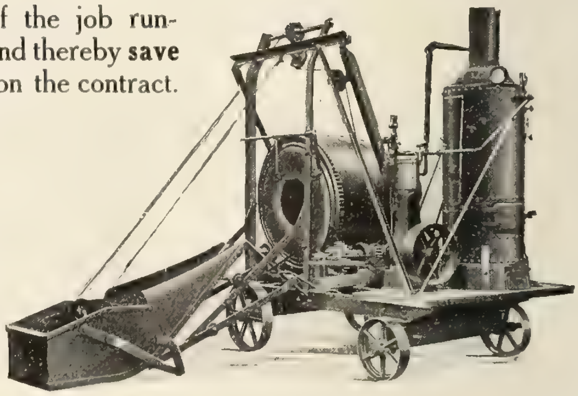
by Using

The Wettlaufer Improved Heartshape Mixer



Then you will be **sure** of the job running **smoothly** and **easily** and thereby **save** yourself **time** and **money** on the contract.

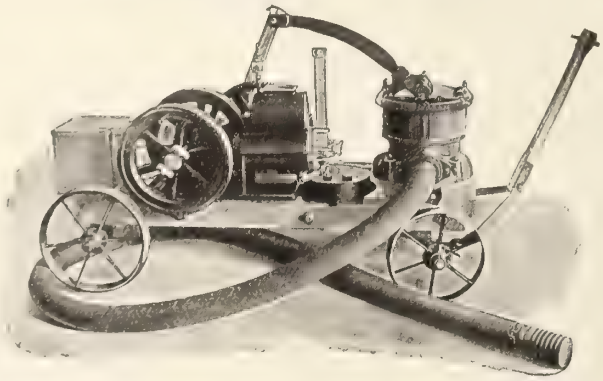
The Wettlaufer Heartshape Mixer will mix right up to capacity every minute of its operation.



Economical Working—Low Running Cost—Automatic Operation Throughout

The Wettlaufer Pump

Here is a pump that will pump out your abutments and foundations, or in any place where you are troubled with water, at an average rate of 3,000 gallons per hour.



Saves Time and Money

Does more than the work of two men at a cost of not more than 36c. a day—that is a direct saving of time, labor and money—a saving that will very soon pay the cost of the pump.

*Send for catalogue of **Mixers** and **Pumps** and come and see them working any time at*

WETTLAUFER BROTHERS

TORONTO

FACTORIES: **Mitchell, Ont.** **Buffalo, N. Y.** **Detroit, Mich.**

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Hooton & Moore
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MONTREAL OFFICE and WAREROOMS: **316 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave**

Steelcrete TRADE MARK CONSOLIDATED

WHY

Steelcrete TRADE MARK CONSOLIDATED

Reinforcement is Superior to all Others

(12 REASONS)

Steelcrete TRADE MARK CONSOLIDATED

Theoretical Considerations

(1) **It possesses a high elastic limit—not less than 55,000 lbs. per sq. in.** This is not attained at the sacrifice of quality or uniformity. "Steelcrete" is not a brittle and inferior steel but a tough, cold-drawn product with no equal in the market for uniformity of strength.

(2) **It provides against concentrated loads.** Its diamond-shaped structure enables it to distribute the effect of a sudden local load over a great many strands.

(3) **Attains a perfect bond in the concrete.** This is due to its mesh shape which does not permit any slipping and there is no possibility of it.

(4) **Perfect distribution of Steel.** Every foot of width possesses the theoretical amount of steel. The accuracy here attained is impossible in loose rod reinforcement.

(5) **Longitudinal reinforcement.** "Steelcrete" mesh possesses strength in the longitudinal direction of the pipe equal to one third the strength in the circumferential direction.

(6) **Temperature stresses are guarded against.** The form of the mesh provides a positive reinforcement against these uncertain but definite stresses.

Practical Considerations

(7) **"Steelcrete" mesh is essentially a fool-proof reinforcement.** With the use of this material the man with the brains that designs the construction obtains an efficiency of 100 per cent. with ordinary every-day inspection and unskilled labour.

(8) **"Steelcrete" Mesh is a stiff reinforcement.** It holds its position in the forms in a way that no other mesh equals. It is far more important to have the reinforcement placed correctly in a vertical direction than in the horizontal.

(9) **It is cheaper to install.** Requires less labour than any other mesh or system of rods.

(10) **It is easy of inspection.** Only those who know "Steelcrete" know the trouble, delay and anxiety this saves to both contractor and engineer alike.

(11) **It can be placed quickly.** This means a saving in overhead charges. This feature has been overlooked by a great many engineers and architects in the past.

(12) **ALFRED ROGERS IS NOW CARRYING IN STOCK HALF MILLION SQUARE FEET OF "STEELCRETE" FOR IMMEDIATE DELIVERY.**

ROGERS

Portland Cement

makes dependable concrete—carefully ground and screened—gives a quick and strong set. Any quantity, complete shipments.

ROGERS

Crushed Stone

in all sizes—clean and free from dust, dirt and mould. Guaranteed delivery — Send us your orders for crushed stone.

ROGERS

French Caen Stone Cement

Monarque Brand and Cementa-line. Rich in appearance and of unlimited durability—as good as natural stone but cheaper. Full particulars on request.

Quotations made for all Work—Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

28 King St. West **Toronto, Ontario.**

Western Sales Manager
W. J. DINNEN & CO., Winnipeg, Man.

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Linde British Refrigeration Co.

Incinerators
Toronto Furnace Co.

Insulating Compounds
Canadian Mineral Rubber Co.
Standard Underground Cable Co. of Canada, Limited

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Batts Limited
Canada Office & School Fur. Co.
Oshawa Int. Fittings Co.
Rhodes Curry & Co.

Kilns
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F

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Christie, Henderson & Co.
Jamieson Lime Co.
Ontario Lime Association

Lime Kilns
Improved Equipment Co.

Locomotives
Canadian Boving Co.
Montreal Locomotive Works
Canada Foundry Co.

Marble
Dominion Marble Co.
[illegible] Company
Mississquoi Marble Co.

Metal Lath
Greening Wire Co., B.
Metallic Roofing Co.
Noble, C. W.
Steel & Radiation Ltd.

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Hotchkiss Lock Metal Form Co.

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Hopkins & Co., F. H.
McDougall Caledonian Iron Wks
Neptune Meter Co.
Union Water Meter Co.

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Garlock Packing Co.

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Canadian Mineral Rubber Co.

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Billings Chapin Co.
Elaterite Paint Co.
Pinchin, Johnson & Co.
R.I.W. Damp Resisting Paint Co.

Paving Cement
Canadian Mineral Rubber Co.

Paving and Paving Materials
Dominion Creosoting Company
Metropolitan Paving Brick Co.
Ontario Asphalt Block Co.
Paterson Mfg. Co.

Perforated Metals
Canada Wire & Iron Goods Co.
Greening Wire Co., B.

Pipe (Concrete, Iron and Wood)
American Spiral Pipe Works
Canadian Pipe Co.
Dominion Concrete Co.
Gartshore-Thomson Pipe Co.
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Canada Foundry Co.
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Canadian Ingersoll-Rand Co.
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(Continued on page 14)

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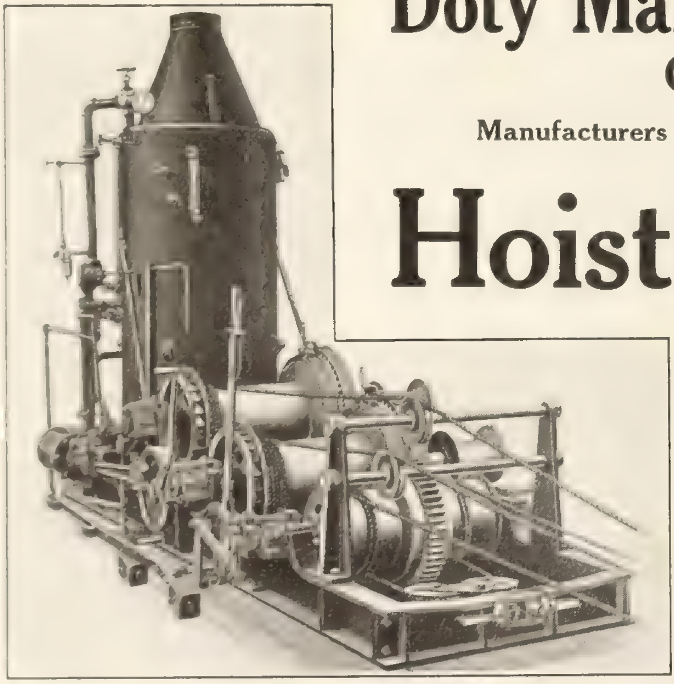
Company Limited

Manufacturers of **Superior**

Hoisting Engines



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The Sawyer Canvas Belt stands the hardest service in Brick and Clay Plants

This is one of the many classes of work to which Sawyer is particularly adapted. Whether you want a main drive, or smaller drive, or a large elevator belt, the Sawyer will do the work.

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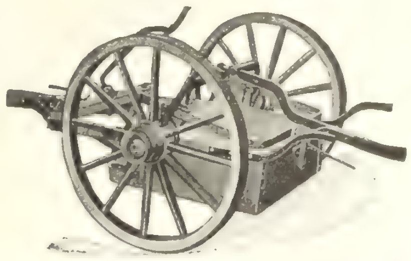

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The Toughest Stone for Macadam in Ontario

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[illegible]
  [illegible]

Safes and Vaults
  Taylor, J. & J.

[illegible]
  [illegible]
  Sand and Supplies Ltd.
  York Sand and Gravel Co.

[illegible]
  [illegible]
  [illegible]

Sewer Joint Asphalt
  [illegible]

Sewer Pipe
  Britnell & Co.
  Canada Iron Corporation
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  Gartshore Thomson Pipe Co.
  National Iron Works
  Ontario Sewer Pipe Co.
  [illegible]
  Standard Drain Pipe Co.

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  Lecky & Collis
  Mun. Engineering & Contracting Company

Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
  Browning Engineering Co.
  Beatty & Sons, M.
  Canada Foundry Co., F. H.
  Hopkins & Co., F. H.
  Montreal Locomotive Works
  [illegible]
  Thew Automatic Shovel Co.
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  Lundy Shovel & Tool Co.

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  Brodie, Jas.
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  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
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  Anderson, Geo.

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  Inglis, John
  Jenckes Machine Co.
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  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Turner & Sons, J. J.
  Woods Limited
  Waterous Engine Works Co.

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  Hunt & Co., Robt. W.

Valves
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  McDougall Caledonian Iron Wks.

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ALPHABETICAL LIST OF ADVERTISERS

[illegible]	109
[illegible]	93
[illegible]	
[illegible]	
[illegible] Works	106
[illegible] Company [illegible]	87
[illegible] Brick & Tile Co.	92
[illegible] & Derrick Co.	2
[illegible]	23
[illegible]	88
[illegible] & Co., Limited, George	22
[illegible]	85
[illegible]	104
[illegible]	107
[illegible]	86
[illegible]	92
[illegible] R. D.	
[illegible]	
[illegible]	
Beatty & Sons, Limited, M.	36
Bechtels Limited	108
Bennett, Robert	105
Blystone Machinery Company	107
Bowman & Connor	104
Britnell & Company, Limited	98
Browning Engineering Company	
Bremner, Limited, Alex.	103
Brown Hoisting Machinery Company	
Brown Machine Company	98
Brodie & Company, James	
Buff & Buff Manufacturing Company	93
Cabot, Incorporated, Samuel	85
Campbell, R.	100
Canada Cement Company	3
Canada Foundry Company, Limited	95
Canada Iron Corporation Limited	103
Canada Lifting Jack Company	
Canada Steel Company	27
Canada Wire & Cable Company	27
Canada Wire & Iron Goods Co.	97
Canadian Boving Company	28
Canadian Bridge Company	100
Canadian Buffalo Forge Company	110
Canadian Fairbanks-Morse Co. Ltd.	111
Canadian H. W. Johns-Manville Co.	
Canadian Kellogg Company	39
Canadian Mineral Rubber Company	14
Canadian Office School Furniture Co.	78
Canadian Pipe Company, Limited	83
Canadian Ingersoll-Rand Company	38
Ceresit Waterproofing Company	
Chain Belt Company	88
[illegible]	104
Christie Henderson & Company	92
Clapham & Sons, John	85
Cleveland & Erie Machinery Company	109
Commercial, The	
Conduits Company Limited	103
Consolidated Stone Company	84
Consolidated Plate Glass Company	86
Consumers Gas Company	82
Contractors' Supply Co., Ltd.	98
Cook, A. D.	88
Corinthian Stone Company	33
Crown Gypsum Company	19
Crushed Stone Limited	91
Dake Engine Company	103
Dennis Wire & Iron Works Company	81
DesMoines Bridge & Iron Company	27
Dickson Bridge Works	85
Dikeman Surveyor Company	104
Dominion Bridge Company	100
Dominion Concrete Company	80
Dominion Creosoting Company	29
Dominion Ornamental Iron Company	34
Dominion Marble Company	21
Dominion Sewer Pipe Company	20
Dominion Steel Castings Company	26
Dominion Wood Pipe Company	97
Don Valley Brick Works	7
Doty Marine Engine & Boiler Co.	12
[illegible]	

Elaterite Paint Company	
Engineering Works of Canada	
Erie Machine Shops	78
Escher Wyss	
Farmer, John T.	104
Ferguson, H. S.	104
Foundation Company	
Fraser, E. M.	104
Fuce & Smith	104
Galt Engineering Company, John	104
Galt Stove & Furnace Company	80
Garlock Packing Company	
Gartshore, John J.	104
Gartshore-Thompson Pipe & Foundry Co.	102
Gandy & Company, L. H.	86
General Supply Company	28
Goodyear Tire & Rubber Co. of Canada, Ltd.	37
Greening Wire Company, Limited, B.	87
Gurley, W. & L.	93
Hagersville Contracting Company	13
Hancock, Jr., H. Syd.	104
Hamilton Art Glass Co., Ltd.	78
Hamilton Bridge Co.	
Hamilton Mfg. Company, Wm.	21
Hamilton Pressed Brick Company	
Harvey, J.	109
Heinicke Company, H. R.	20
Hepburn, John T.	32
Hobbs Manufacturing Company	
Hopkins & Company, F. H.	112
Hotchkiss Lock Metal Form Company	91
Hunter Bridge & Boiler Company	101
Hunt & Company Robert W.	104
Hynes, W. J.	
Improvement Equipment Company	
Imperial Wire & Cable Company	111
Inglis Company, John	77
International Marine Signal Co.	18-92
Jamieson Lime Company	
Jenckes Machine Company	2
Johnson, A. H.	84
Kennedy, James C.	104
Kerr Engine Company, Limited	89
Koehring Machine Company	82
Laurentian Granite Company	109
Laurie & Lamb	1
Lautz Company	25
Lea, R. S.	104
Lecky & Collis	17
Leonard & Sons, E.	91
Linde British Refrigeration Company	24
London Concrete Machinery Company	9
Lundy Shovel & Tool Company	22
Luxfer Prism Company	90
MacLean Daily Reports	96
Mahan & Company	
Marsh & Henthorn, Limited	80
McDougall Caledonian Iron Works Co., John	79
McDowal, R.	104
McKinnon Holmes & Company	80
McMillan & Sons, W.	
McNeil & Company, William P.	102
Meadows, George B.	39
Metallic Roofing Company	81
Metropolitan Paving Brick Co.	23
Miller & Company, Geo. M.	
Mississquoi Marble Co., Ltd.	92
Mitchell Company, Limited, Robert	100
Montreal Locomotive Works Limited	91
Morrison & Company	104
Munderloh & Company, Limited	94
Mussens Limited	4
Myers, Oakley	91

Napanee Iron Works	17
National Bridge Company of Canada	101
National Iron Works Limited	103
National Pipe & Foundry Company	102
Neptune Meter Company	18
Noble, Clarence W.	81
Northwestern Terra Cotta Company	97
Ontario Asphalt Block Co. Ltd.	106
Ontario Sewer Pipe Company	20
Ontario Wind Engine & Pump Co.	91
Ormsby Limited, A. B.	34
Oshawa Interior Fittings Company	88
Owen Sound Iron Works	99
Pacific Coast Pipe Company	1
Paterson Manufacturing Company	15
Pedlar People	35
Phoenix Bridge Company	97
Piggott & Company, Thomas	84
Pinchin, Johnson & Company	110
Power & Son	
Provincial Steel Company	26
Queenstown Quarry Company	103
Reid & Brown	104
Rhodes Curry Company, Limited	107
"R.I.W." Damp Resisting Paint Co.	19
Rogers, Limited, Alfred	11
Roman Stone Company	30
Royce Limited	
Sackville Freestone Company, Limited	36
Sand & Supplies Limited	102
Sarnia Bridge Company, Limited	101
Sawyer Belting Company	13
Sheldons Limited	18
Sheppard, James	
Silcox, A. B.	85
Slack & Company, T.	109
Smart-Turner Machine Company	1
Smith, Limited, Thos. & Wm.	
Smyth &Ryan	97
Standard Ideal Company	40
Standard Steel Construction Co.	101
Standard Underground Cable Co. of Canada.	
Stanley Company, W. F.	21
Star Expansion Bolt Company	21
Steel Company of Canada	26
Steel & Radiation	8
Stinson-Reeb Builders' Supply Co.	40
Structural Steel Company	100
Sturtevant Co. of Canada, Ltd., B. L.	39
Taylor, J. & J.	101
Thew-Automatic Shovel Company	23
Toledo Wheelbarrow Company	84
Toronto Plate Glass Lmporting Co.	1-97
Toronto Iron Works	106
Trussed Concrete Steel Company	98
Tuec Company	108
Turner, C. A. P.	90
United States Steel Products Co.	31
United Typewriter	
Urschel-Bates Valve Bag Company	
Waterous Engine Works Company	94
Weeks, Arthur L.	104
Welch & Company, H. J.	104
Western Canada Contractor	98
Western Wheeled Scraper Company	13
Wettlaufer Bros.	10
Woodstock Wind Motor Company	99
Woods Limited	106
Wood and Service	104
York Sand & Gravel Company	98

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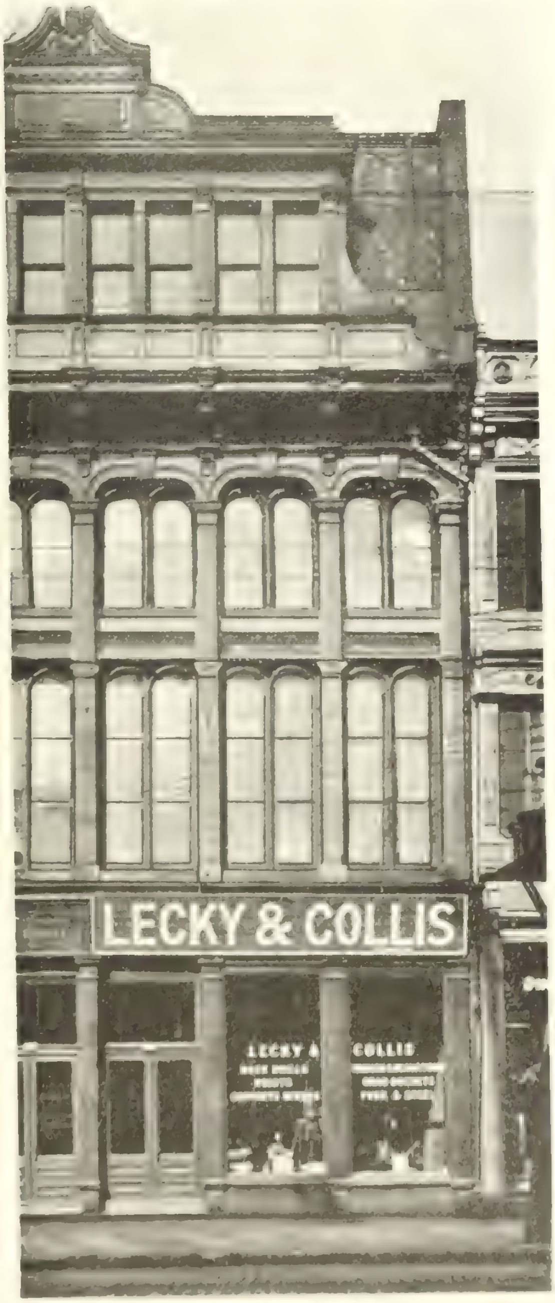

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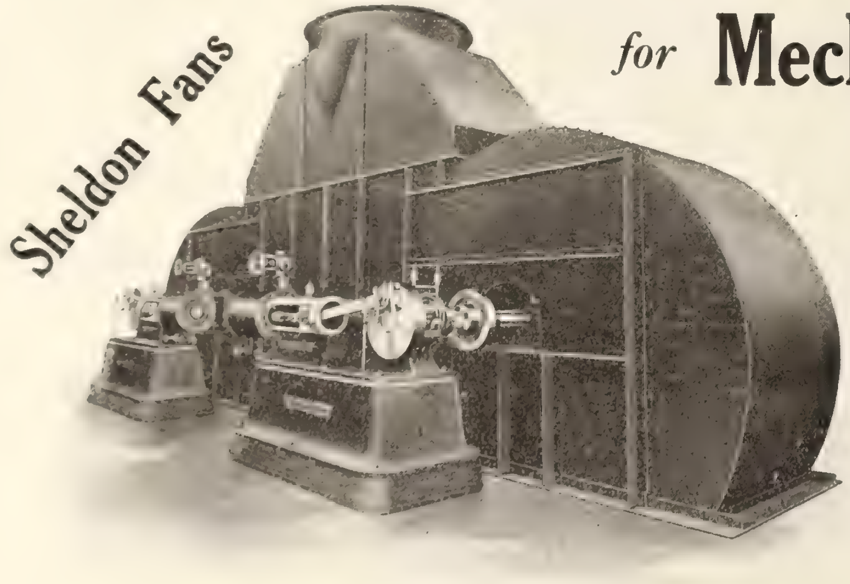

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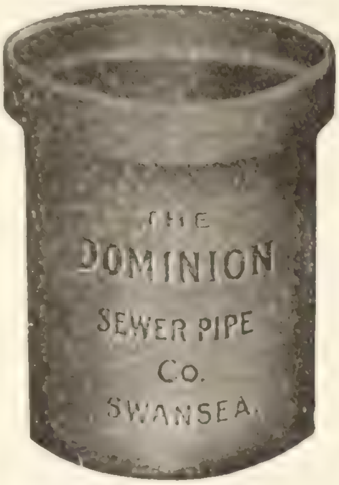

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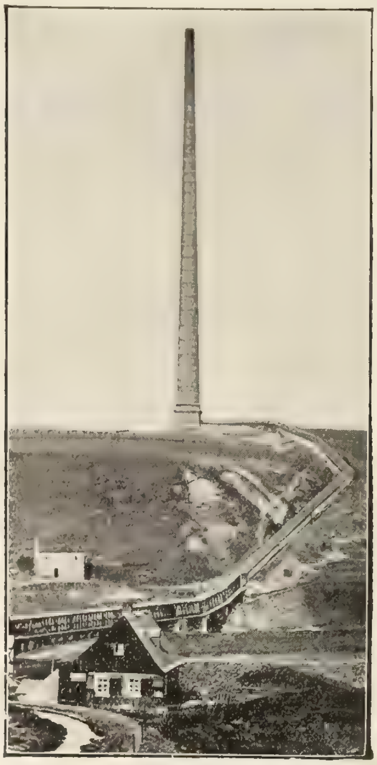

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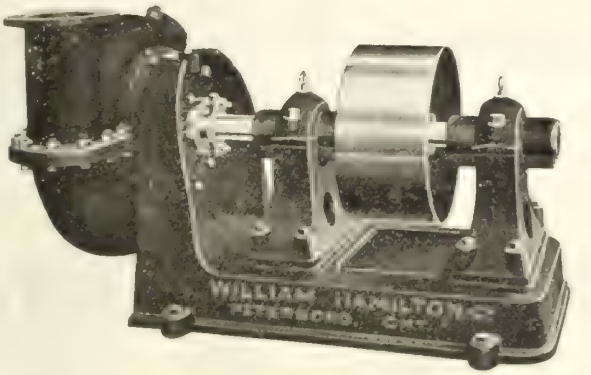

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There is also room enough between the pulley and bearings to prevent any oil dripping on the belt.

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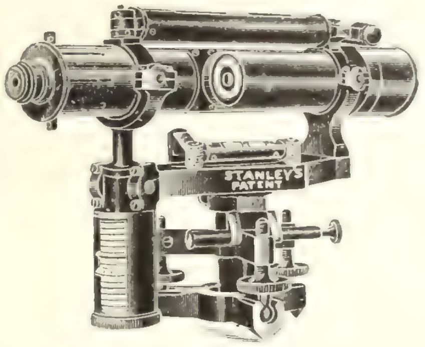

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Sebco Products may be had from dealers everywhere; they are made of malleable iron, brass and of lead composition; in all sizes from 1/8" to 2" in diameter.

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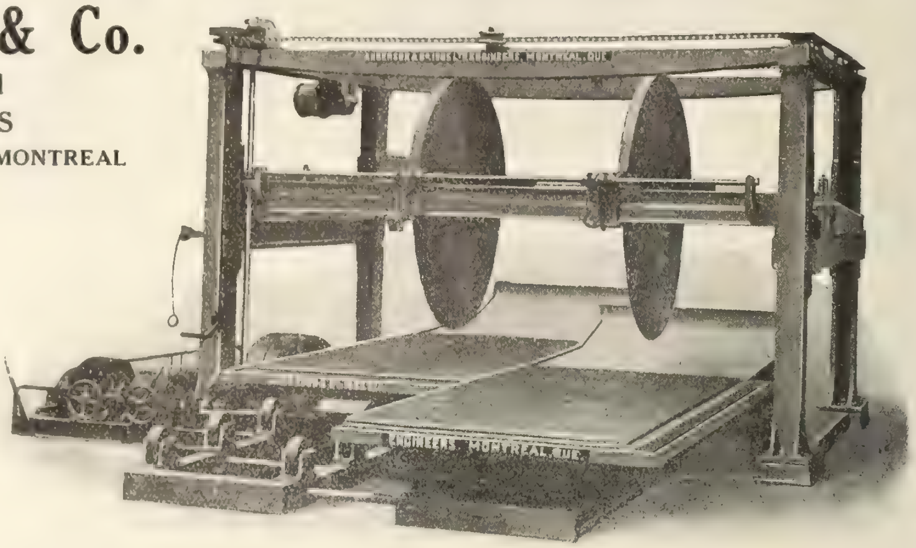

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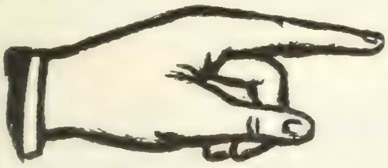

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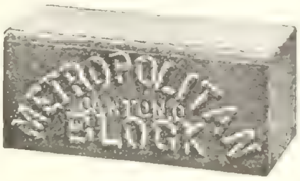

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The general use of the Thew Shovel in road building and street grading is conclusive proof that it is adapted to the conditions, economical for the purpose and efficient in operation. The following list of some of the contractors, in the State of New York alone, who have used and are using The Thew No. O Full Circle Swing Shovel in this class of excavation will indicate the popularity of the machine and its undisputed merit on such work :

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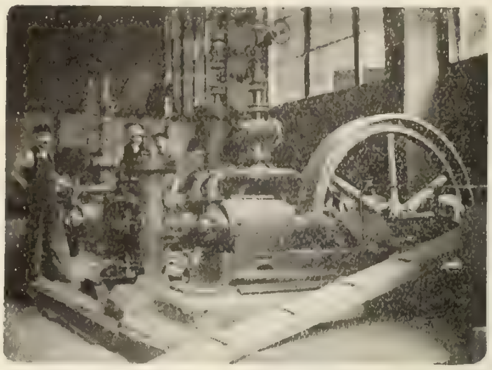

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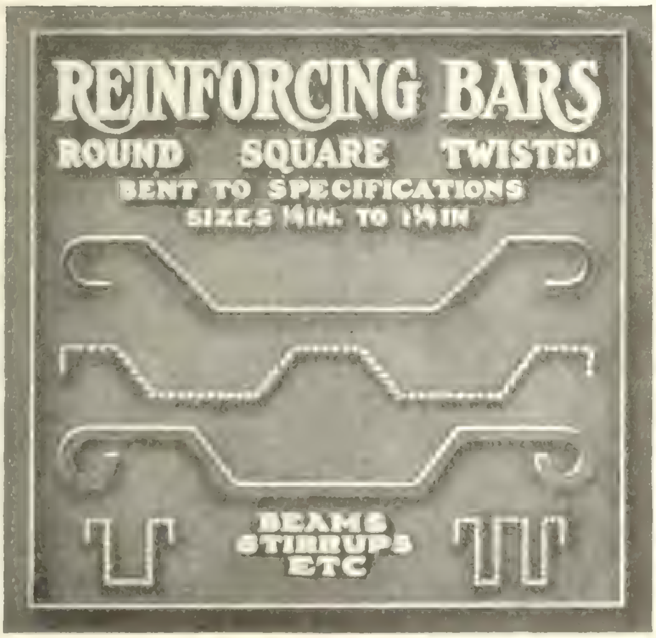

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Angles from ¾ x ¾ in. up to 2 x 2 ins.

Round and square from ⅜ in. up to 1¼ ins.

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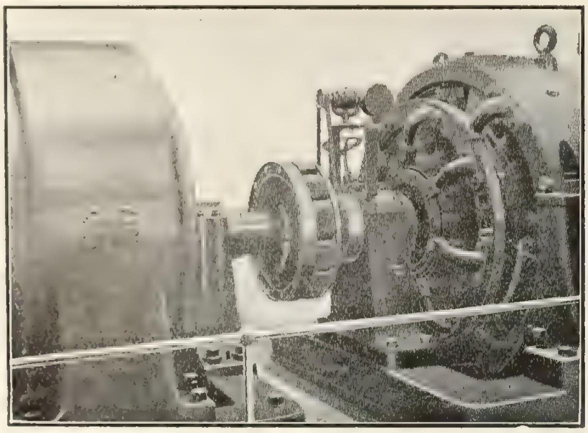

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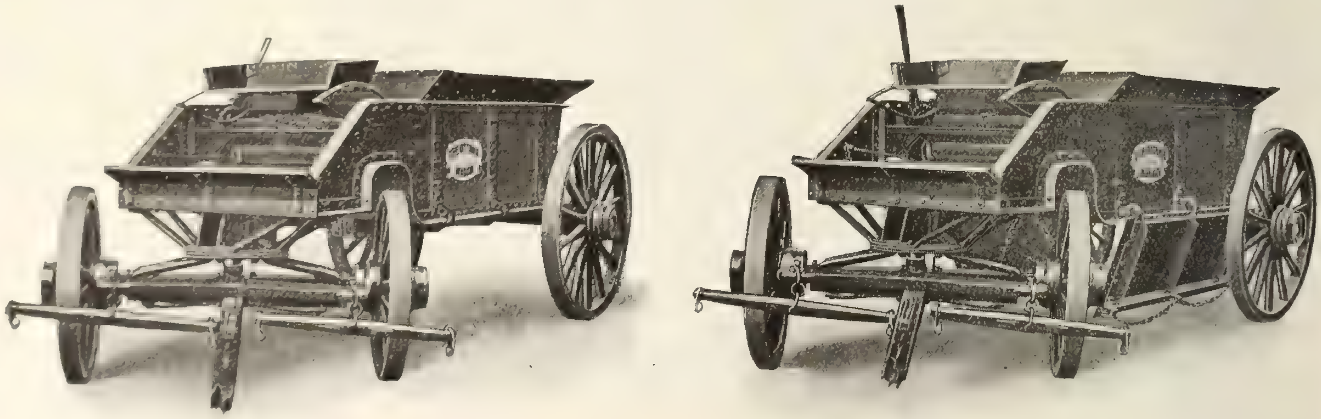

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are the latest development in Dump Waggons, and the original cost is no higher than inferior makes.

Strong, light, everlasting, first cost is last cost.

Let us demonstrate the superiority of this Dump Waggon over all others.

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The first Creosoted Wood Block Pavement laid in America was on Tremont Street, Boston, Massachusetts, twelve years ago.

This pavement was laid to secure a test of the wearing qualities of Wood Block.

The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

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The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

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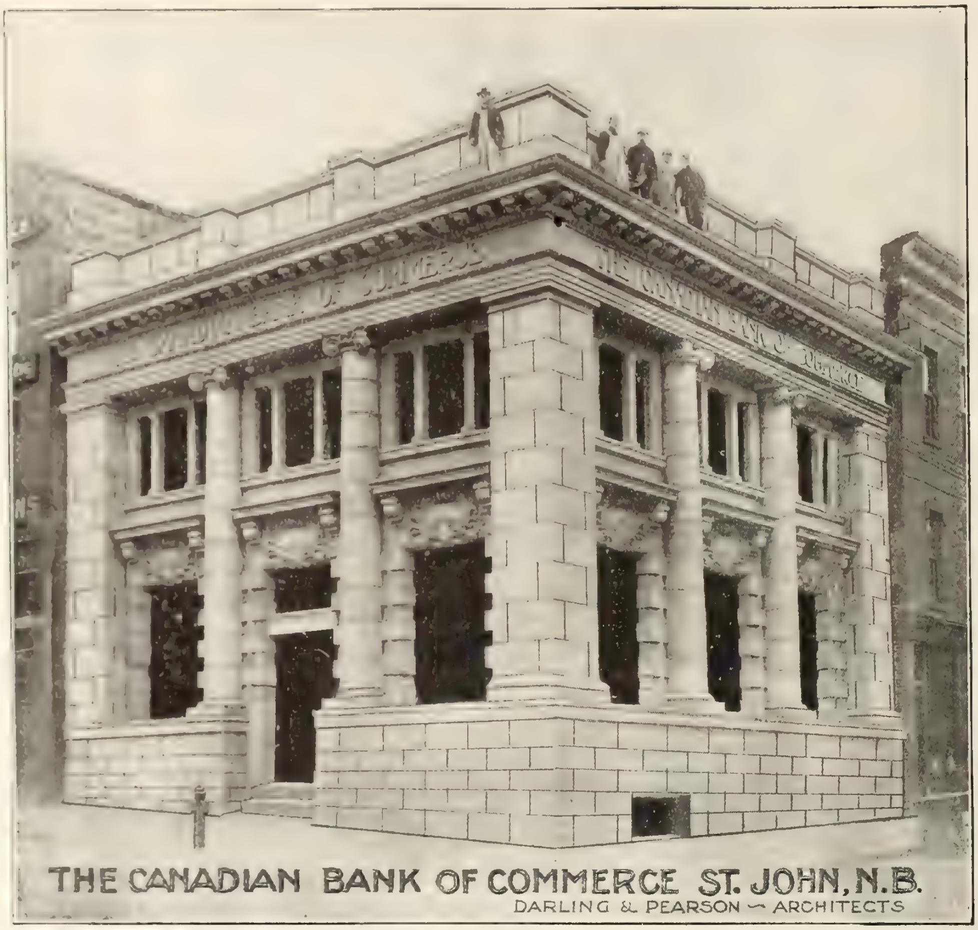

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It can be cut and carved just like Natural Stone and has the additional great advantage of being reinforced.

Roman Stone is of uniform texture and hardens with age—it is the same quality all the way through—no veneer.

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Tensile strength 85,000 lbs. per sq. inch.

Every wire tested for its entire length by process of manufacture.

Furnished in rolls 150, 300 and 600 feet long.

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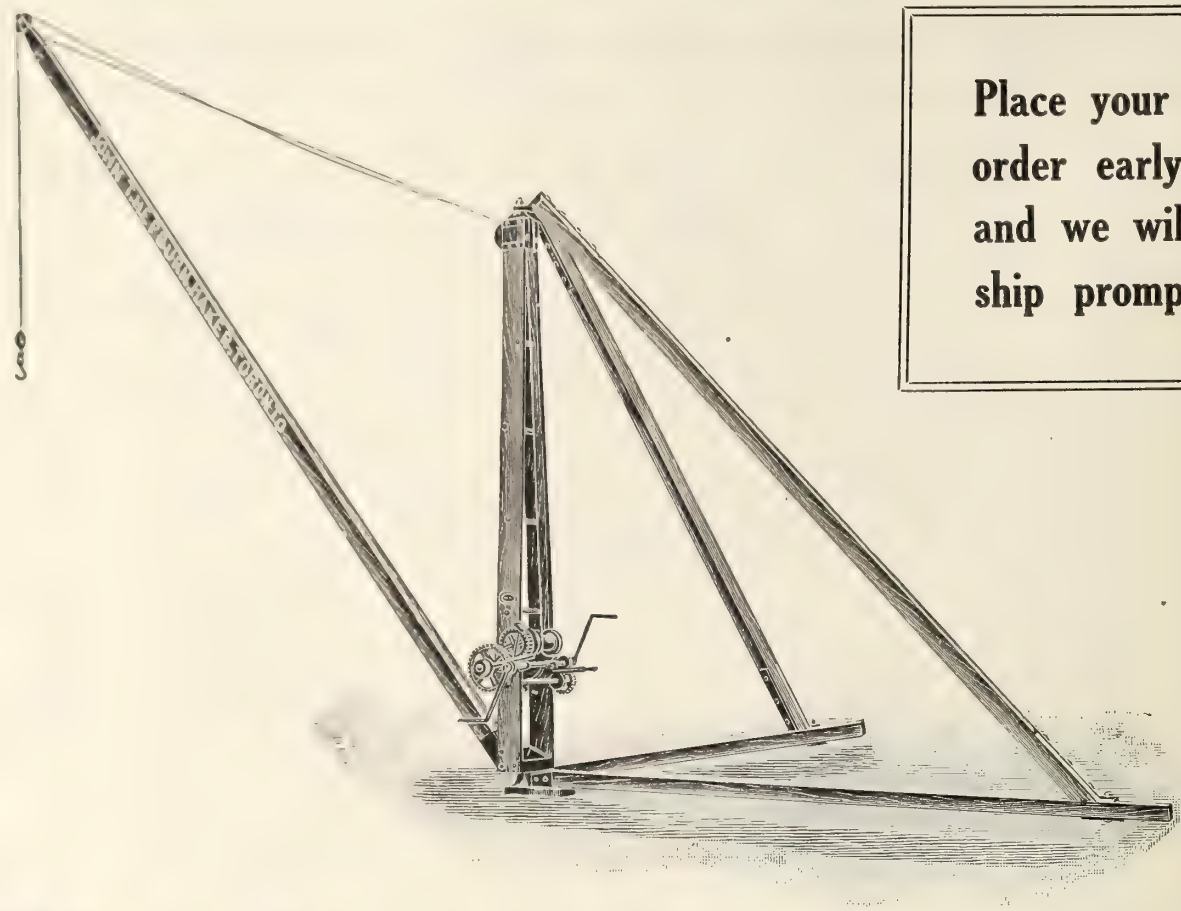
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Place your order early and we will ship promptly.

The Proved Economy of Hepburn Scotch Derricks

If you cut the time upon a job and still do the job right, you are time and money in pocket. When you reduce labor by better methods and better equipment you also save time—and save money. You can get through more work, in less time, and at a better profit.

Hepburn Derricks represent bed-rock economy in construction work equipment.

They have weight where weight is needed. They have great strength. Yet every part is so well proportioned, so accurately and staunchly built, that a Hepburn Derrick is more easily operated and will do more work than any other derrick on the market.

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Made in standard sizes—one-half ton upwards. Interchangeable parts kept in stock for prompt shipment. Operated by hand or power. Fitted with single and double-purchase gears, band brake, and high-grade wire heaving rope. Interchangeable parts always in stock.

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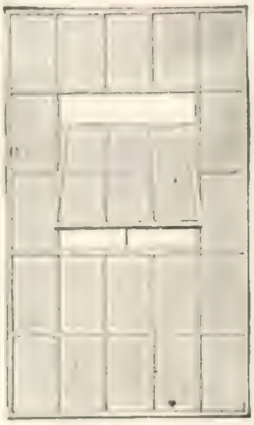

Fire protection to-day is a matter of vital importance. Business houses who claim to be abreast of the times, realize this, and many Establishments are being fitted with our Specialties. We manufacture and install, Steel Sash, Fireproof Doors and Windows, Rolling Steel Doors, Skylights, Roofing, etc., etc.

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SEE that your construction includes Pedlar Metal Building Specialties. There are hundreds of small specialties made by us for fire-retardant work. These cost little. They secure slow-burning construction. Our specialties meet needs for brick walls, concrete walls and floors, fire-retardant partitions, walls, ceilings and roofs. We can completely equip a fire-retardant structure for strength and safety.

Please consult with us and send specifications. We are glad to serve you for new or remodeled structural work, to make it fire resistent.

METAL FABRIC

We make beam reinforcements for floors of expanded metal, to meet span and loading desired. We also make lath of expanded metal for covering columns, walls, elevator shafting, etc., and for fireproof ceilings and roofs.

The cost is small. The protection is immense.

PEDLAR

CLINTON FABRIC

We have for sale Clinton Electrically Welded Fabric with high-carbon steel tension and cross members. This makes a reinforcement with 50% higher tension value than rod for floors. For heavy service Concrete Floors, we make Ferro-Dovetail Steel Reinforcement arched or flat to specification. Also made for fire-retardant roofs. These make excellent factory construction.

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Pedlar "Perfect" Vents with skylight window have automatic fire-link. Give perfect ventilation automatically. We supply with bases to meet specification. Ask for Booklet.

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Pedlar specialties include metal fire-retardant studding, furring, track, etc. These, with Pedlar metal lath and concrete, make a fire-proof partition wall. For fireretardant ceilings either lath and metal furring, Ferro-Dovetail plates, or Pedlar Steel Ceilings may be used. Ask for details.

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Pedlar Wall Bonds for brick construction, bind the wall into a strong, substantial structure of brick, which cannot separate under the stresses of vibration or fire. Free sample on request.

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Derrick Car placing 100 foot Deck Plate Girder Span in Missinabi River Bridge on the Transcontinental Railway. The Hamilton Bridge Works Co. together with many other prominent firms favor "Beatty Hoists" for this exacting work.

You cannot see the Hoisting Engine in the picture but it is there, ready at all times and equal to any work it is called upon to do.

This accounts for our receiving the larger portion of orders for engines used on this class of work.

We are equally well able to furnish YOU a Hoist fitted for YOUR individual needs.

May we send you new descriptive matter covering our Engines and Buckets, etc. We'll be glad of the chance.

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A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

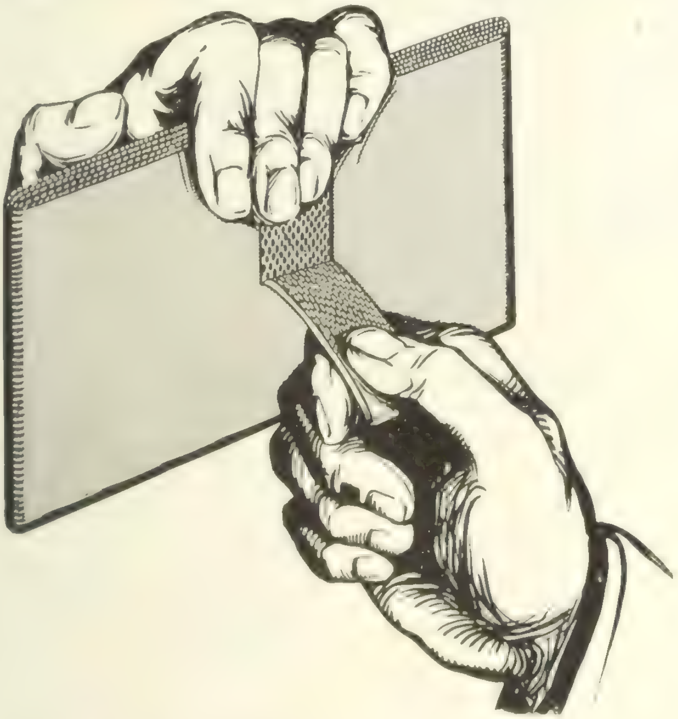
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE 50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit—and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS A TOTAL OF 72,000 FEET

We have just completed an order for the [illegible] of GOODYEAR RUBBER BELTING from one [illegible] concern in the west [illegible] of inferior [illegible]. [illegible] confidence in the quality of GOODYEAR Belting.

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In the choosing of belts our booklet would be of great assistance to you. We supply it free. Write to our nearest branch for one.

The Goodyear Tire and Rubber Company of Canada, Limited

Factory, Bowmanville, Canada

BRANCHES: Victoria, B.C. Vancouver, B.C. Calgary, Alta. Regina, Sask. Winnipeg Man. London, Ont.
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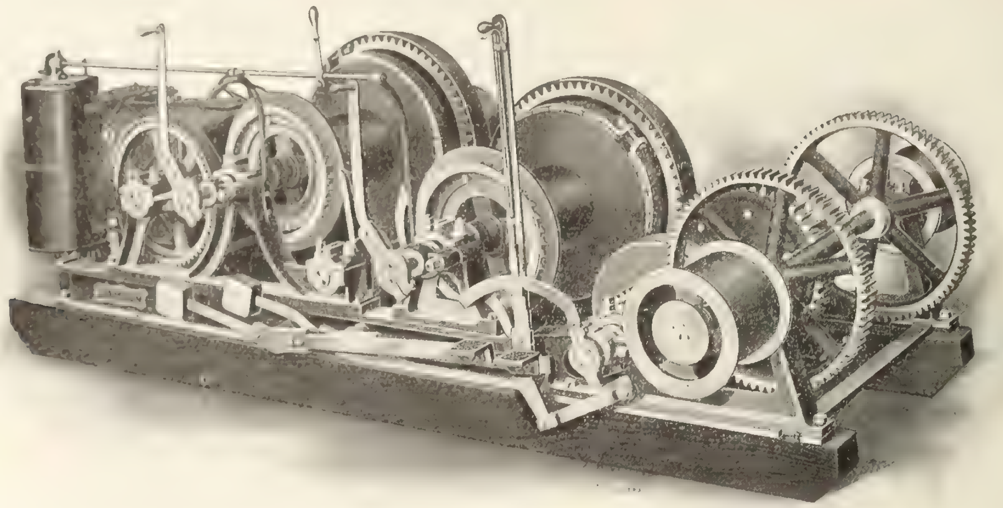
ELECTRIC DERRICK HOISTS



Where electric power is available electric Hoists are manifestly superior to steam. There is no trouble or worry in cold weather with steam or water pipes, no boiler troubles, no smoke nuisance; just a smooth quiet running, easily operated, sanitary machine.

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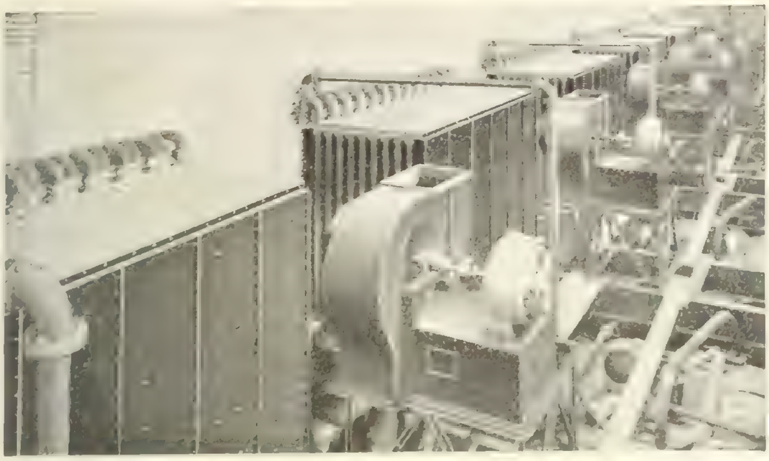

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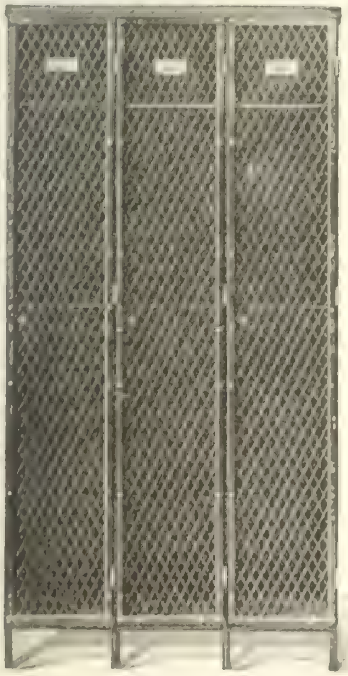

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ESTABLISHED 1886

Contract Record
and Engineering Review

PUBLISHED EACH WEDNESDAY BY
HUGH C. MACLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
VANCOUVER - Tel. Seymour 2013 - Hutchison Block
NEW YORK - Tel. 3108 Beekman - Tribune Building
CHICAGO - Graceland 3748 - 4059 Perry Street
BOSTON - - - Main 1024 - - - 643 Old South Building
LONDON, ENG. - - - 3 Regent Street, S.W.

SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 27 January 15, 1913 No. 3

Profit and Loss in Contracting
Things that Make for Success or Failure

SUCCESS in constructive out-of-door business depends on too many conditions to allow any hard-and-fast rules of conduct to be laid down, but at the same time, the man who desires to succeed as a contractor must certainly observe certain principles, which, if acted upon, will prevent loss, though they may not, and, indeed, do not, always bring great profit.

There are two qualities which a man must possess if he expects to succeed under any circumstances. These are ability to judge character, and a knowledge of when to spend money freely. The first of these is absolutely essential to the contractor, whose profit or loss on a job will often depend upon the honesty and ability of his subordinates carrying on work at a distance. Every contractor of any standard is sure to have more than one big job in progress at the same time, and often at a considerable distance apart from each other. He cannot be present at all of them, and, being wanted also at headquarters, he must perforce rely on his staff. Years ago this condition of affairs did not exist to nearly the same extent as now. Each contractor's area of operations was more limited for one thing, and besides this, workmen were less nomadic in their habits. Master and man had their interests more in unison. In many cases they grew up together. The man knew what his employer wanted, and knew how to do it in the least costly way. The employer knew his man, and relied upon him. The man took a pride in his employer's success, in the reputation of his works or yard, and employers and men rarely parted. All this has changed of late years, and it has become essential to success in the contracting business to be able to read men readily, to judge character and integrity, and to discriminate between the competents and the incompetents.

Another aspect of the conduct of "out of door" or distant jobs, in which success depends upon the contractor himself, is the care he takes to send the material to the site in the order which will most expedite progress there. This principle is frequently neglected, plates, girders, or rivets being sent, none of which will be required possibly for a month to come, while men are kept at unprofitable jobbing pending the arrival of parts needed at the moment. Nothing is so provoking as to see loads of plates and bars arrive, none of which will be needed till the work is much farther advanced. Gangs of men may be on the spot waiting for rivets of a particular length, and about noon bags of rivets do arrive, but not those wanted. All these delays mean expense and loss on the job.

Another source of expense and waste is caused by a lack of that quality in a contractor which teaches him to spend money freely when to do so is the most profitable policy for him. Solomon tells us that "There is that which scattereth and yet increases, and there is that which withholdeth more than enough, but it tendeth to poverty." This also is the reason why a man with plenty of capital can make more on a contract than a poorer man. The poor cannot afford to be economical. We have seen cases where, owing to parsimony, much money was simply thrown away—men kept idle over and over again waiting for tools to be sent from headquarters, sufficient supplies not having been sent up at first. Alterations are sometimes required in details, owing to small oversights in the yard, and the things must go by rail to headquarters, entailing great expense of money and time. Contracting on these principles cannot fail to result in loss and ultimately failure.

It does not follow that men are to be given tools just because they ask for them, but on works of any magnitude, a storekeeper, or a leading hand acting as storekeeper, should be appointed and held responsible for all the tools, and he should give timely notice to the foreman of what tools will probably be required before the end of the week.

An inspection should be made every evening at closing time to see that there is no danger of accident or mischance during the night. Neglect of this is often attended with disaster. For example, a girder at a pier on a bridge works was left in the slings, partly raised on a derrick pole, which was stayed by guy ropes. The weather had been dry for some days. Rain came at night and the wet caused the guys to shrink so much that the one with most strain of the girder on it gave way and in the morning the derrick was found, of course, prostrate, and the girder in the river.

Another excellent way of wasting money is by using bad tools and defective plant because they are cheap.

Nothing, on the one hand, can be more distressing or harassing to an inspecting engineer than having charge of works conducted in a slip-shod manner, while, on the other hand, he derives both pleasure and information when overlooking the work of able and skilled men who can and do carry it out well.

A 5,000-foot stretch of concrete highway has been opened to traffic at New Village, Warren County, N.J. It has been laid experimentally in an endeavor to find a road material that will stand heavy traffic, where the swampy nature of the underlying soil makes it impossible to keep macadam roads in good condition.

PROGRESS ON THE QUEBEC BRIDGE CONSTRUCTION

Special to the Contract Record and Engineering Review

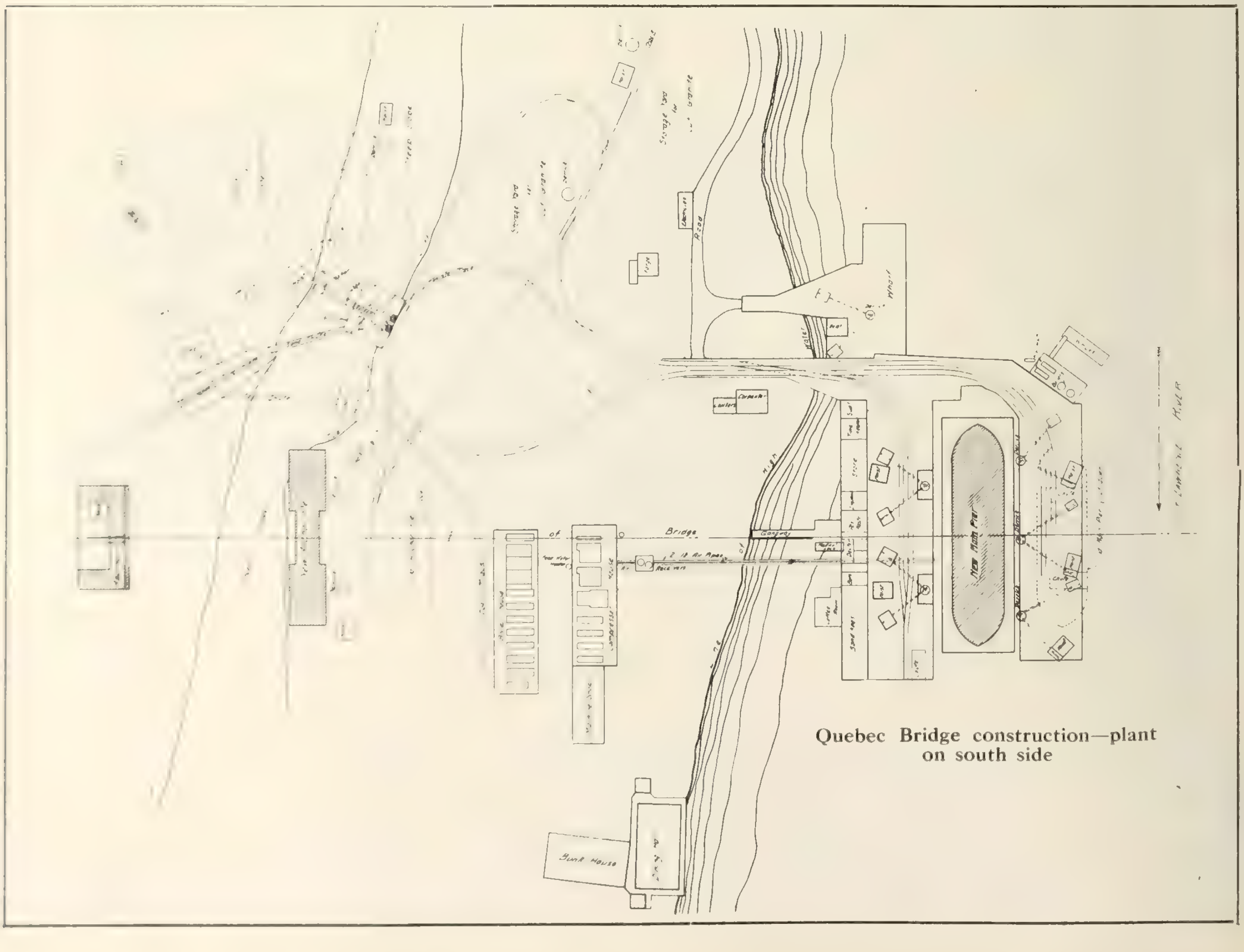
Sinking the Caisson for the South Main Pier.—The construction and design of this caisson have been described fully in former issues of the Contract Record and this article deals mainly with the sinking and layout of the plant.

The caisson is 181 ft. 0 in. x 55 ft. 6 in. by 100 ft. high, built of 12 in. x 12 in. yellow pine with a cutting edge of 30 in. x 30 in. B.C. fir. The working chamber is 8 ft. high divided into eighteen compartments by bulkheads, with a roof, or deck, 3 feet thick.

The actual sinking began on June 15th, 1912, when the air pressure was first put on, the caisson resting on the bed of the river which had been levelled previously to placing the caisson. From this date the work was pushed on continuously until Oct. 25th, when the cutting edge rested on rock 83 feet below the river bed and 100 feet below high water. Owing to the unusual size of this caisson, special precautions had to be taken at every stage of the sinking to avoid straining the walls and thus opening the seams, allowing leakage of air.

In June, before any attempt at sinking was made, about 2,100 cu. yds. of concrete were laid on the deck, forming a solid block 7 feet thick. To give further rigidity and to resist distortion the concrete was reinforced with steel bars 2 inches square. The bars were laid longitudinally and laterally, spaced about 5 feet centre to centre, great care being taken in placing the concrete around them to secure a good bond with the steel.

A novel method of sinking was used. This to the writer's knowledge, has never been tried before in a river caisson. The weight of the caisson was not at any time carried by the cutting edge. as is the usual practice, but by blocking and sand jacks bearing against the bulkheads and roof of the air chamber. The sand jacks, forty in number, carried during a settlement the entire weight excepting the frictional re-



Quebec Bridge construction—plant on south side sistance of the material against the walls. The jacks, which were simple in construction, were manufactured on the site. The plungers, cylindrical in shape and made from one piece of B. C. fir 30 in. in diameter and 4 feet long, were bolted securely to the roof of the air chamber. This plunger fitted into a steel cylinder filled with fine clean sand resting on a base of 12 in. x 12 in. timbers covered with burlap to prevent the escape of sand. The caisson was lowered by robbing the sand from the cylinder, using a one-inch water jet inserted in the horizontal pipe. The sand was caught at the other end of the pipe and used for refilling the jack.

The caisson was not allowed to sink continuously but was held stationary on blocking and jacks for two or three days at a time until ready for a settlement of from 24 to 30 inches. The blocking would then be removed, the caisson lowered by the jacks in from thirty minutes to an hour and then blocked solid until the next settlement.

The work from one drop to the next was laid out systematically, following a fixed routine, without confusion. A drop having taken place, the first step was to reset the jacks. The cylinders were hung up to the deck, the bases removed and a new bearing dug out about 3 feet lower. The cylinders were then replaced and filled with sand rammed well into place to give a good bearing for the end of the plunger. All the jacks reset, the next step was to excavate the material in the central part of the chamber with blowpipe and bucket and finally to ditch the cutting edge. A trench about 4 feet wide was dug inside the cutting edge completely around the chamber and divided into sections by cross walls every 10 feet. The material under the edge itself was then attacked and taken out to a depth of about 30 inches and to a distance of 4 inches outside the caisson wall. As fast as one section was excavated it was filled again with soft blue clay to avoid blow outs and keep the ditch dry. When a blow out took place however, the water was confined to one section of the ditch and the main part of the chamber was not flooded. The cutting edge completely cleared and sealed with clay, it was carefully sounded with long pointed iron rods to make certain that no boulder had been overlooked and remained beneath it.

The actual sinking was always under the personal supervision of the superintendent, who, with his assistants, remained in the chamber until the caisson rested on blocking in its new position. Rods were placed in the ground vertically to show settlement and two sandhogs were stationed at each jack. At a given signal, the winking of the electric lights, one bag of sand was taken from each jack simultaneously, thus giving a uniform settlement to the caisson. If, however, it was desired to sink one side faster than the other in order to preserve the alignment, the jacks on the other side could be held. So perfectly was the caisson controlled that in sinking 84 feet it did not deviate from its correct position east or west and only slightly toward the north, this being caused by the influence of the caisson of the old main pier only 5 feet distant. A drop of 24 inches has been obtained in 18 minutes without lowering the pressure.

The material encountered in the first twenty-five feet was very hard, it consisting of glacial drift, sand, gravel, and a very large percentage of boulders. Many of the boulders ran as large as 3 or 4 cu. yds. each and required constant blasting in the chamber. The sinking progress through this material was difficult and necessarily slow as the greater part of the excavated material had to be placed by hand, in buckets, and hoisted through the air locks. A settlement of 26 inches was obtained, on an average, in 3 days.

Caisson, south main pier

This stratum was underlaid by about 50 ft. of fine grey quicksand extending down to within a few feet of the solid rock. This sand, in place was hard and firm, but ran readily when attacked by the water jet. Clean and unmixed with gravel, it was found to be excellent for the sand jacks, thus saving the expense of screening and handling sand from the beach. Practically all of this deep layer of sand was excavated by the blowpipes, as many as ten being used at one time.

An interesting innovation was introduced in the operation of the blow pipes. It has been customary to have the pipe a constant diameter from the suction to the discharge. As an experiment, these pipes were increased from 4 in. diameter at the bottom to 6 in. at the discharge. The results were very satisfactory. A greater efficiency and higher lift were obtained as the maximum velocity was developed on the smaller section at the bottom, where it was most effective.

Rapid progress was made through the sand, a set-

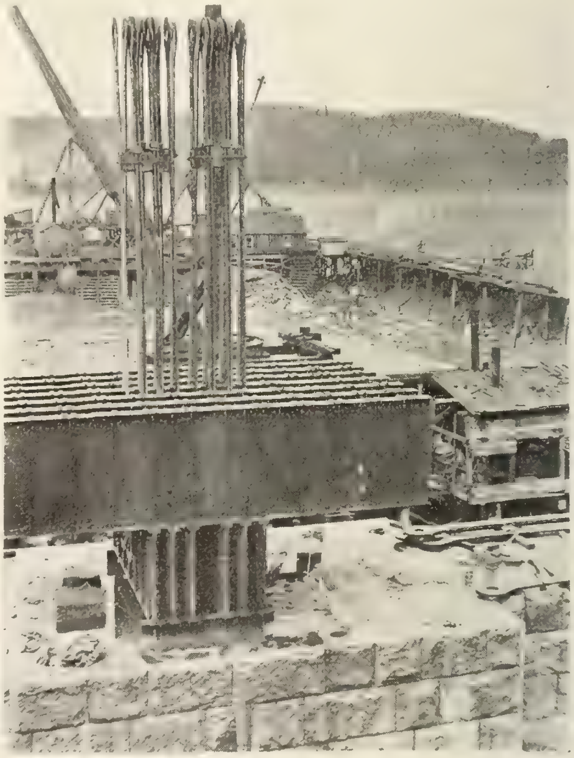
Plant on south side—north in distance

tlement of 12 inches taking place every day. In the month of September the sinkage record was 31 feet—a little better than a foot a day.

At a depth of about 75 feet a layer of hard pan was encountered. This was composed of clay and gravel, compact and hard to remove with a pick.

The sinking was continued, and on Oct. 25th the cutting edge rested on bed rock, a mixed red and grey shale overlaying the Sillery sandstone. This rock was tested to a depth of 15 feet with a diamond drill and found to be solid. It was then cleaned off and the air chamber concreted, the air pressure being finally released on Nov. 18th. The building of the caisson walls and the placing of the concrete went on simultaneously with the sinking. The concrete was built up to Elevation 75 where the granite shaft begins, but owing to the lateness of the season no granite was laid. This work will be begun as early as possible in the spring of 1913, the granite being built up 53 feet to 28 feet above high water. When finished, this pier will contain about 38.000 cu. yds. of masonry.

First stone on north anchor pier


Anchor pier—anchorage steel in place for one truss

One of the unusual features of the caisson was the arrangement of the man locks. In all, there were ten 36 in. air shafts, six for material and four ladder shafts for the men. To handle the large gangs of "sandhogs" quickly and safely, a horizontal tunnel lock was installed a few feet above the deck and connecting with a ladder shaft. This lock was 20 feet long, 6 feet in diameter and could hold 75 men at one time—although it was never used for more than 50. Benches were built along the sides and when coming from the high working pressure of 40 lbs. per sq. in. the men could sit comfortably during the 25 minutes required for decompression. Leaving this lock they climbed to the level of the dock by a spiral stairway. One ladder shaft, also, was used by the superintendent and inspectors and for carrying tools, etc., into the air chamber. The other three ladder shafts were kept lighted in readiness for an emergency which fortunately did not occur. The air chamber was also connected with the office by a telephone, which worked very successfully.

On the wharf were placed the offices, hospital and sand-hog quarters. The latter were fitted up for the comfort of the men, contained shower baths, lockers, and benches. Hot coffee was served free at all hours. The doctor or his assistant could be found at all times in the hospital which contained a medical air lock, the best known appliance for treating the caisson disease, or "bends" as it is commonly known. Every man working in the pressure had to undergo a medical examination and could not enter the chamber un-

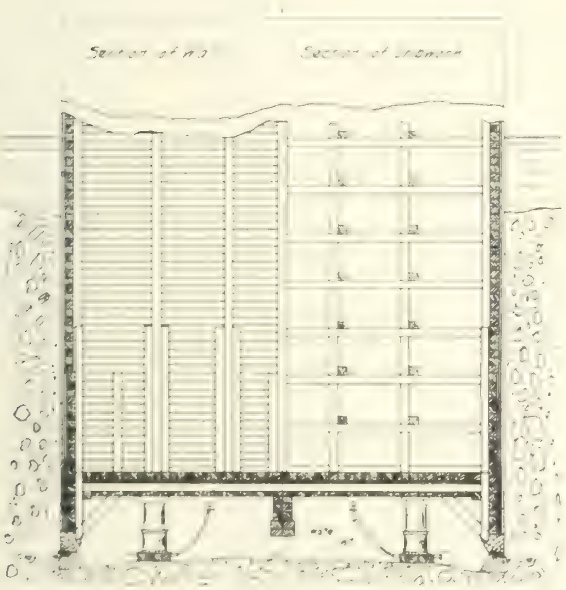
North anchor pier, showing blocks for placing steel

Plungers for sand jacks

less he had received a certificate from the doctor. It is due no doubt to these precautions that although three hundred men were working in the pressure each day no one developed serious injuries from the high air.

The working schedule was as follows:

First 50 feet	3 shifts of 8 hours each.
50-60 feet	4 shifts of 6 hours each.
60-70 feet	6 shifts of 4 hours each.
70-80 feet	8 shifts of 3 hours each.
80-end	12 shifts of 2 hours each.

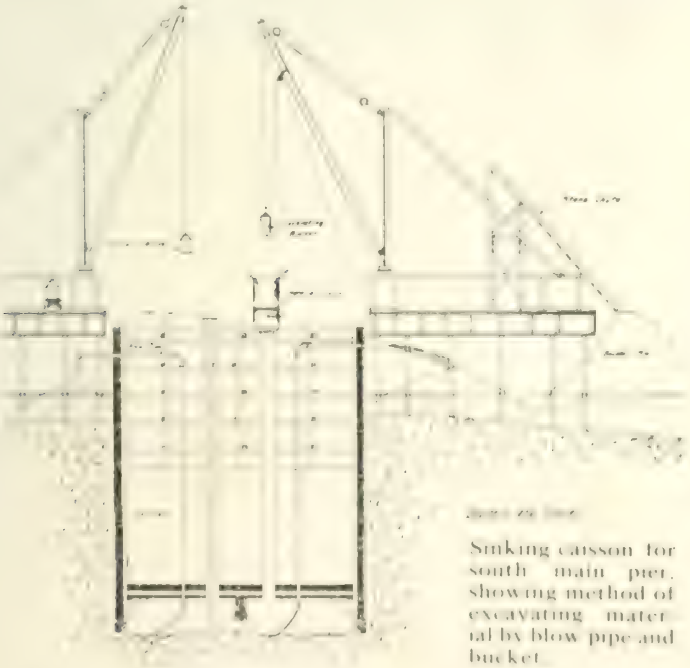


Section showing method of lowering caisson by means of sand jacks

The maximum pressure obtained was 42 lbs. per sq. inch at about 100 feet below high or 88 feet below mean water.

The Plant

The layout of the contractor's plant, shown in the drawing, was made in such a way as to give rapid and efficient operation. Every advantage was taken of the natural features of the ground and materials were hauled by gravity wherever possible.

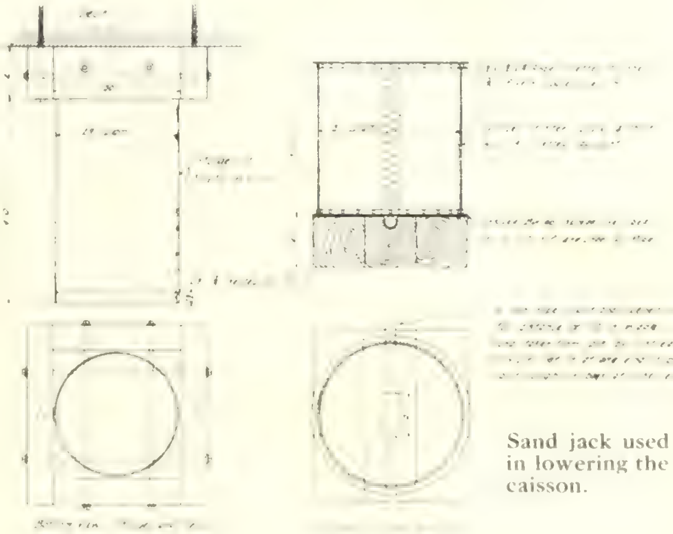


Sinking caisson for south main pier, showing method of excavating material by blow pipe and bucket.

The cement, sand and coal were brought in from the railway on standard gauge tracks and reached the lower level by means of chutes. The coal was unloaded from dump cars into a hopper and shot down into a bin. From this bin it was loaded by a chute into narrow-gauge dump cars which ran on an elevated track and dumped directly behind the boilers.

The concrete plant was laid out down the face of a steep cliff. The rock, a native sandstone, was quarried from the top of the cliff and handled from the quarry by derricks directly into the hopper of a No. 8 McCully gyratory cursher. From this crusher it passed over a dirt screen to a No. 5 crusher and thence through a rotary screen to the stone bin. Beneath the stone bins were the mixer hoppers opening directly into two 1½ yard Ransome mixers, which in turn dumped into the concrete buckets on lorry cars running on a circular track to the caisson.

The concrete hoppers themselves are worthy of mention on account of the small number of men required to operate them. Each hopper was shaped like a truncated pyramid and was divided vertically into three compartments with one door at the bottom common to all. One man operated two levers, letting sand and stone into the compartments, while a second took the proper number of cement bags from a chute and emptied them into the third section. The first man then operated the bottom door with a lever letting all three into the mixer drum at once and at the same time gave the correct amount of water from a tank with a float gauge. Two lorry cars were coupled together, each carrying a Steubner dump bottom bucket, spaced so that the mixers dumped simultaneously. Both cars were handled by one horse, the track being laid with a down grade to favor the full buckets. By the circular layout of the track the buckets were hauled to the caisson and brought back on a loop thus avoiding switching and delay.



Sand jack used in lowering the caisson.

The efficiency of the plant is shown in the daily run of concrete. The record was as high as 420 cu. yds. in one day's run from two mixers and 350 cu. yds. from one mixer only. No concrete was placed at night as enough was put in during the day to keep up with the sinking progress.

The main boiler plant consisted of one 250 h.p. and three 125 h.p. Heine water tube, nine horizontal—8 of 100 h.p. and 1 of 75 h.p. and two vertical boilers of 150 h.p. each, a total of 1800 b.h.p. Other smaller boilers were used for some of the derricks. The water was supplied to the boilers and to the water jets in the air chamber at a pressure of 80 lbs. by two 12 in. double acting Worthington pumps.

The air plant comprised 7 compressors: four straight line, one compound, and two compound double phase compressors, all Ingersoll-Sargent, with a total capacity of 13,100 cu. ft. of free air per minute. From the compressors the air passed into two receivers and was led in two 12-inch pipes to the caisson, passing through a trough 200 feet long filled with running water for cooling. This cooling was very effective and the temperature of the working chamber was kept below 80 deg. F. One small high pressure compressor was used to supply power for the air tools. A dynamo in connection with this plant provided electric light for the caisson and outside plant.

Concrete plant and coal chute, south side

The timber used in building up the crib was brought from the contractor's mills at Sillery and delivered in scows at the wharf.

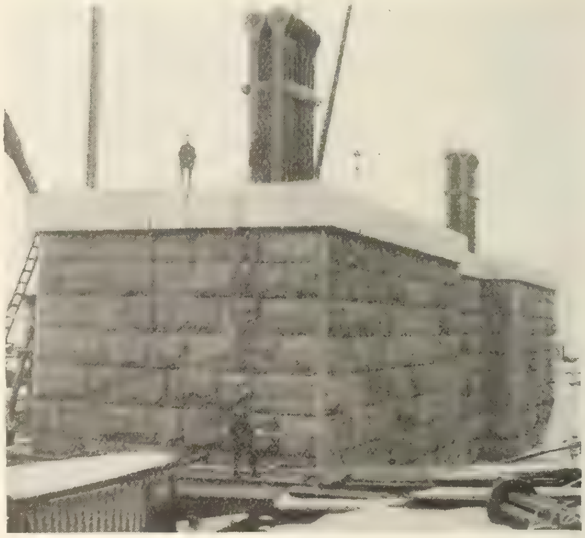
Progress on Other Piers

While the sinking of the caisson has been the greatest engineering feat this season, the construction of the other piers has gone ahead rapidly and has been productive of many interesting features.

Caisson No. 1, showing material lock

The north abutment has been rebuilt to conform to the change in elevation of the base of rail and the intermediate pier on the north side has been completed. This pier is 60 ft. x 14 ft. x 68 ft. high and contains about 1,700 cu. yds. of granite and concrete. About 7,000 cu. yds. of masonry have been laid on the north anchor pier and the anchorage girders have been concreted in place. The north main pier is now built up to high water, 4,000 cu. yds. having been added this season. The foundation for the south anchor pier is well under way. The excavation was completed and the concrete footing partly laid when the work was stopped by the severe weather.

In order that all piers may be completed in 1913, the contractor is preparing the granite face stones during the winter. The quarry at Riviere a Pierre is being kept open and stone shipments will be made as quickly as possible. A large shed has been fitted up in the north yard and about 60 stone cutters are at work. In addition to the ordinary plug air drills, the contractor is using four air surfacing machines, each of which will do the work of approximately ten men. These are especially valuable in cutting the coping and other dressed courses. As fast as the stone is finished it is stored on the fore-shore, near the piers, to be in readiness for an early start in the spring.


North anchor pier at close of 1912

The layout and supervision of the entire plant is directly under Mr. S. H. Woodard, M.Am.Soc.C.E., engineer for the contractors, Messrs. M. P. & J. T. Davis, and his superintendent, Mr. Jas. E. Taber.

The St. Lawrence Bridge Company, contractors for the superstructure, have begun operations at the site. They have erected the north anchorage and are now building their camps and laying out their plant for the erection of the steel which will begin next season. These operations are being carried out under the supervision of Mr. W. B. Fortune.

The Board of Engineers having entire supervision of the Quebec Bridge is composed of Messrs. C. N. Monsarrat, of Montreal; Mr. R. Modjeski, of Chicago, and Mr. C. C. Schneider, of Philadelphia. They are represented on the work by Mr. John D. Wilkens, resident engineer, and staff.

Modern Equipment for Road Building

Considerations in the Purchase of Machinery Liability of Breakdown and Expense of Up-keep — Wagons, Stone Crushers, Etc.

IN a paper presented before the recent convention of the American Road Builders' Association, Mr. F. E. Ellis discussed some of the main factors to be considered in equipping road building work with proper plant. A summary of his remarks is given below.

Interest and Depreciation

A road, 6 miles in length, was built and surfaced with local stone grouted with bituminous binder. The stone was obtained from a quarry which was situated so that the average haul was about 2 miles. The whole contract amounted to $60,000. A contract of this size is considered an average season's work for one gang of men and one set of equipment. From the following calculations, the cost of small tools, such as picks, shovels and scrapers, is omitted and only the larger items of wagons and machinery are considered. The total cost of equipment was $18,240 or 34 per cent. of the contract price. The interest on the cost of equipment at 6 per cent. and depreciation at 10 per cent. per year makes a total of $2,918.40 for fixed charges on equipment, necessary to do $60,000 of work per year, or approximately 5 per cent. of the amount of the contract.

Most of the expense of equipment was chargeable only to a few items in the contract which included the surfacing. The contract price for these items amounted to approximately $32,000. The first cost of the equipment used in the work covered by these items was $16,445 or 51 per cent. The interest and depreciation upon the same amounted $2,631.20, or 8.2 per cent. of the amount of the work done. This, Mr. Ellis believes, is a fair estimate of the amount of equipment and the charges which should be made for a contractor to be safe in estimating upon work of this character. There is hardly any business conducted, Mr. Ellis stated, in which the investment for equipment is so large and the expense due to depreciation and up-keep so great, as in road building.

Road building machinery should be purchased only after a thorough investigation, especially in regard to the liability of breakdown and the expense of up-keep. The expense of repairs on road building machinery is very small in comparison with the loss which is occasioned by the disorganization of working crews by breakdowns. In deciding upon the purchase of machinery too much weight should not be given to the item of first cost, as the more expensive machine, in first cost, may be a far cheaper machine to operate.

Wagons

Four kinds of wagons have been largely used upon road work—the four-wheeled bottom-dumping wagon, the four-wheeled two-horse tip-cart, the two-wheeled one-horse tip-cart and the four-wheeled slat wagon. The slat wagon offers no advances over the other types, except that it is a little lower and easier to load. This advantage is altogether outweighed when the time lost in dumping and turning around is taken into consideration. The single horse tip-cart is very economical on short haul and for work in contracted spaces, and for making end and side dumps on embankments, or in hauling stone from the quarry to the crusher. The four-wheeled tip-cart may be hauled and handled very easily on road work, but with the weight all on the hind wheels it is very destructive to road surface and subgrade, and much time is lost in dumping and righting the wagon. The bottom-dump wagon can be used anywhere that the two-horse slat wagon or tip-cart can be used, and is more economical than either, the expense of maintaining roadway being very much less than with the other kind. Material can be dumped more quickly, since it is not necessary to stop while dumping, and the material can be distributed to better advantage than with any other type of wagon, according to Mr. Ellis.

Any wagon used on road work should have tires not less than 4 in. wide. A road machine can be used to advantage in digging side ditches, scraping shoulders and making light cuts in the roadway. A machine for this purpose should be built strong enough to be hauled with a steam roller or traction engine without danger of breaking the machine, and also be equipped with a steering device so that the machine may be worked outside of the traveled roadway, while the roller or traction engine is working upon the firm traveled way.

Stone Crushers

Three types of stone crushers have been used to a great extent in road building—the gyratory type, the jaw type of the Blake pattern and the jaw type with the cam shaft and roller. The gyratory type, Mr. Ellis has found, is not very well adapted for portable plants on road work, as the crusher opening is so narrow that the stone requires too much sledging in order to be properly fed to the crusher, and the crusher opening is so far above the ground that it requires either a pit or an extremely high dumping platform with a long incline in order to get the stone into the mouth of the crusher. The gyratory crushers are also said to be complicated and expensive to keep in repair for work in the eastern part of the country, as it is a long way from the source of supply of the repair parts. For permanent plants, where the stone breaks well in blasting, they are very economical machines.

The advantage of the Blake pattern, Mr. Ellis states, is its extreme simplicity, there being fewer reciprocating parts and a smaller number of bearings which require oiling than in any other crusher. There is a wedge adjustment by which the crusher opening may be regulated without stopping the crusher. This is an important feature where enough fine stone must be dumped along the shoulders of the road ahead of the bottom course, as in the case of grouting bituminous work. There are only one tension rod and one spring to keep in adjustment and repair. There are no bearings into which stone chips and dust are liable to enter. This type of crusher, Mr. Ellis has found, is very economical to maintain and extremely reliable. The disadvantages of this type are that for the same size opening the crushers weigh more than the other type of jaw crushers; they are not so easily transported and handled; the position and size of fly-wheels in reference to the crusher make it more un-nearly to dump close to the crusher than with any other type. As a rule the first cost is in excess of the other type of crusher.

The advantage of the cam shaft and roller type crusher is its light weight, which makes it easy to transport and set up; low fly wheels, situated so that the stone may be dumped much closer to the crusher opening than in the Blake type; low first cost and the speedy delivery of repair parts. The disadvantages are that it is much more complicated; has more moving parts, more springs and tension rods than the Blake type. There are more bearings to be lubricated, and the toggle lever shaft is generally situated so that chips and dirt can enter into the bearings. No adjustment can be made regulating the opening of the jaws without removing the toggle, which can only be done by shutting down the crusher. Both crushers of the jaw type here mentioned will produce about the same kind of stone for the same size receiving opening and require about the same horse-power to run.

All crushers should be fitted with manganese steel jaw plates, as experience has shown that these plates will last about three times as long as a first-class chilled iron plate, and are unbreakable, whereas the chilled iron plate may break or wear out in pockets after running a very short time. Most all crusher manufacturers make complete plants composed of bins, crushers, elevator and engines, which are mounted on wheels and can be loaded upon freight cars without being knocked down. Plants built in this style are very economical to handle and set up and are adapted to nearly all kinds of contracts requiring crushed stone. Where a traction engine is used for hauling stone away from the crusher it is more economical to have larger bins and longer elevators than are generally furnished with a strictly portable outfit, as it is necessary to have storage capacity in the bins large enough to load a train of traction cars without waiting for the stone to be crushed.

Engines and Boilers

On a good many of these portable outfits, the screen plates and elevator buckets are made of too thin material to wear well. The elevator buckets wear and rust quite rapidly, unless specially ordered, and the sprocket wheels and gears are usually made of cast iron. The small sprocket wheels and beveled gears, Mr. Ellis thinks, should be made of manganese steel. The crusher engine should always be large enough so that there is a surplus of power over and above that which is ordinarily required to supply each crushing plant, and the boiler should have a capacity large enough to supply the steam for a drill, and, in addition, run the crushing plant. In a great many cases, if this is not done, an additional boiler will have to be provided.

Most of the states have laws which govern the construction and inspection of boilers; care should be taken to procure a boiler which will pass state inspection. Any boiler built in accordance with Massachusetts standards can be used in other states, but there are many boilers which can be used in other states which can not be used in Massachusetts. Plants equipped with boilers built to the Massachusetts standard will cost more than boilers furnished with crushing plants.

Tractors and Rollers

Where there is enough work to keep a hauling engine busy, and suitable provision can be made for loading and unloading quickly, a hauling engine may be used to advantage, and is about 50 per cent. cheaper than horses. There is still an opportunity for improvement in hauling engines, especially in regard to gearing and traction wheels. Most of the makers using cast steel gears which are uncut and very rough and wear very quickly. They also use a built-up rivetted or bolted wheel with rolled steel rim. These wheels are generally a source of trouble, as the spokes get loose and break where the travelling is rough and stony, as it is on most construction work. There is no class of machinery used in road building in which there is as wide difference in construction and design and first cost as in steam road rollers. A double cylinder type of steam road roller, it is believed, is better adapted for road construction than any other type. There is no class of road building machinery which has been so highly developed as the steam road roller. In looking over a road roller with a view of purchasing, particular attention should be given to an investigation of the gearing and wheels.

A set of rear wheels should last, under ordinary service, at least 10 years. Wheels have been in service 14 years. The gearing on steam rollers should be of steel, cut and fitted as nicely as in any high-class automobile.

The plants of the Canada Cement Company at the present time are operating on an output of 8,000,000 barrels a year, but with the extensions to present plants and new ones being erected, the company expect by the first of August of next year that there will have been an increase of 50 per cent. in output, bringing the total output for the year to over 12,000,000 barrels.

On some recent work in New Orleans, corks have been used to plug holes left by the form bolts in the concrete walls. The corks are made slightly larger, driven in a little way, and the hole pointed up with well compacted mortar.

A bill has been introduced in the Cuban Senate forbidding the letting of contracts for either national or municipal work except to contractors who are citizens of that country. The bill is the outcome of the recent collection of the claim of an American firm against the government for $557,000, representing the final settlement of the Cienfuegos waterworks contract. The bill also provides that in case any foreigners are apparently sub-contractors interested in such contracts they shall be compelled to sign an agreement renouncing all right to the protection of the diplomatic representatives of their country.

Arguments in favor of omitting the house trap, in order to increase the ventilation of sewers, were recently advanced by Mr. R. L. Fox of the Sewer Commission, Batavia, N.Y. He states that omission of the house trap permits a better discharge of house sewage and prevents solid matter from settling in the soil pipe. Further, it simplifies and reduces the expense of plumbing and obviates the frequent clogging of the house connection at this trap. It likewise reduces the danger of illuminating gas from leaky mains reaching the house, as the omission of the trap allows the gas to pass freely up the stack and be harmlessly dissipated. The air in a trapped soil pipe, it is said, is more dangerous to health than the sewer air, and free circulation will prevent the formation of dangerous gases to any extent.

Concrete Pavements Tamped with Mechanical Vibration

CONCRETE pavements, surfaced with crushed granite and compacted to a high density by means of a mechanical vibrator, have been laid in certain cities in Texas. This method of road building is described as follows by Mr. R. D. Stubbs, contracting engineer, of Dallas:

Concrete is delivered to the subgrade, after it has been properly shaped and rolled, by inclined chutes from a mixer. The proportions are 1 part Portland cement and 5 parts of aggregate, consisting of sharp sand and gravel. The amount of coarse aggregate passing a ¼-in. sieve should not exceed 40 per cent. nor be less than 33 per cent. The mix is made rather wet.

The surface is brought to the desired shape by means of long-handled floats, and is immediately covered with a coating of crushed granite, graded from ⅝ to 1½ in. in size. The surface is then ready for the vibratory treatment. Platforms 20 in. wide, made of ⅝x 4-in. strips, cleated ¼ in. apart, are then placed along or across the street and a movable vibrator is rolled over the road, compacting the concrete to a high density. As the work progresses the platforms are brought forward and the granite surfacing behind is immediately covered with sharp sand and watered. Two or three days later the sand is swept off the surface into the gutter with stiff wire brooms and the street surface is treated with Tarvia. Upon the Tarvia is spread a coating of hard stone from ¼ to ⅜ in. in size. Upon this surface is spread the sand formerly swept into the gutter. The surface is then rolled with a 500-lb. road roller and after the work is seven days old the street is opened to traffic.

Mr. Stubbs states that he employs no bituminous filled joints for the expansion of the pavement, but he does provide for contraction while the concrete is setting by placing on edge on the subgrade at intervals ¼ x 3-in. wooden strips so that these will be buried in the concrete and will occupy the bottom half of the cross section. Within 48 hours after the concrete has been laid, according to Mr. Stubbs, thin, straight lines of relief will appear over the breaker strips. These thin relief lines never exceed 1/16 in. in width. Mr. Stubbs advocates the use of these relief joints only in the case of very dense concrete, but in the case of poured concrete not compacted by vibration he does not favor their use.

Ancients Used Hollow Tile

A writer in the "Chicago News" makes the following comments on the use of hollow building tiles:—"I will admit that stucco when applied upon wood or metal lath attached to wood studding makes a wall of small value as far as insulation is concerned. If people would build houses, the walls of which were composed of hollow tiles, with stucco exterior, I am sure that they would have no cause to complain about the high temperature within the building in the summer or low temperature in the winter. Probably many are not acquainted with hollow tiles, as they are considered by many a new building material. We do not know the exact date or period when this style of material was first used, but we have found hollow tile walls in buildings devoted to bath purposes in the buried cities around the Bay of Naples. The people at that time recognized the efficiency of dead air space as an insulator and therefore use hollow tiles for walls of the 'hot rooms.' Stucco and like substance for coating exterior walls were used a great many years before the pyramids were ever thought of. The person who said that there is nothing new under the sun was no doubt correct. He probably repeated the statement made by somebody centuries before. There is no question, in my mind, that the stucco and the hollow tile of this period are the best of their respective classes of material that have ever been produced."

Pitting of the concrete walls or hypochlorite tanks of the filtration plant at Harrisburg, Pa., is reported by George G. Kennedy, superintendent of the water department of that city. At this plant hypochlorite of lime is used as a sterilizing agent and is kept in two concrete solution tanks separated by a division wall from the mixing compartment. After the tanks had been in service for some time, it was found that the side and division walls, which were of plain concrete, showed considerable pitting, while the tank bottoms, which had been given a granolithic finish, were in no way affected. To remedy this condition the sides were cleaned off with compressed air, a coat of cement mortar was applied and this surface was given a coating of bitumen paint applied hot. This repair work has not been in service long, but to date it has given entire satisfaction.

Heating a building by means of steam pipes embedded in the concrete floor has been successfully accomplished in the chassis testing building of the Moline Automobile Company, Moline, Ill. The structure is 120 ft. long by 60 ft. wide with door openings extending completely across the ends of the building. The workmen are obliged frequently to lie on the floor in making necessary repairs and adjustments and on this account, it was desired to keep the floor surface comfortably warm. To accomplish this, 1¼-in. steam pipes spaced 42 in. on centres were laid 2 in. below the surface of the 6-in. floor slab. The concrete is reinforced locally against cracking due to the expansion of the steam pipes by corrugated, galvanized iron pipes enclosing the former. Below the floor slab, 8 in. of cinder fill are placed as an insulating material. It is stated that with only five small metal radiators additional, it is possible to obtain a uniform temperature of 65 to 70 deg. Fahr. throughout the building.

In a German brick yard with six million brick yearly capacity, equipped with two continuous kilns, there are employed the following number of men. The clay is hard shale. Six men are used breaking loose the shale, six men for loading and two men for moving the cars. On the brick machinery there are used four men, one man on the elevator, one man for the transfer of cars, and eight boys for the handling of the brick on the drying racks. The kiln takes six men for setting and drawing, besides the two burners. With the superintendent, the time keeper and the labor of loading wagons and cars, there are employed all told sixty-three men. The capacity of the plant is about 20,000 brick per day.

The British Fire Prevention Committee reports that for fire-resisting concrete floors, the reinforcing metal should have a protection of at least 1 inch at the bottom of the floor panel, 1½ inches at the bottom of beams and 2 inches at the bottom of girders.

Design and Construction of the Imperial Theatre, St. John, N.B.

THE most interesting feature, from the engineering point of view, in connection with the erection of the new Imperial Theatre on King Square, St. John, N.B., was the manner in which a serious obstruction was turned into a positive benefit. In digging for the foundation the men came upon the vats of a tannery of eighty years ago, and were compelled to go down twenty feet in some places. In doing so they struck a steady flow of crystal water, necessitating the use of steam pumps throughout the subsequent operations. As they were some distance below the sewers, this flow of water promised endless trouble, but John Clancy, chief engineer for the B. F. Keith Company, who are the owners of the theatre, was equal to the occasion. Having received a favorable report concerning the water from two analysts, Mr. Clancy decided to utilize the supply in connection with all the plumbing of the building. A well is now being sunk in the basement from which the water will be raised by an automatic electrically operated pump to a large steel tank in the fly-gallery, having connection with all the plumbing fixtures in the house. In other words the theatre will have its own water supply for everything except drinking purposes.

The building is a modern adaptation of the Italian renaissance. There will be a store on either side of the main entrance, which is the chief architectural feature of the King Square facade, being enclosed in very ornate framework of cream terra cotta carried to a height of two storeys, and finished with an enriched terra cotta arch. The front of the building will be laid up in yellow "Titanic" brick, with cream terra cotta trimmings. In connection with the pillars on either side of the main entrance an illustration was given of the newly aroused interest of the city authorities in relation to the construction of buildings. The building inspector had given verbal permission to permit the pillars to encroach on the sidewalk, but the new city council reversed his decision and the company had to alter its plans a little and set back the pillars.

The main entrance, or lobby, is 20 feet wide and 35 feet long, with tile floor. The side walls are panelled in variegated marble.

A feature of the main auditorium is the absence of columns, the balcony being supported on a heavy steel truss. Thus every seat commands an unobstructed view of the stage. In addition to the regular doors, four large fire exits are provided, for use in emergency.

The stage is 29 ft. by 76 ft. Beneath this are the dressing rooms, also engine and boiler rooms. The balcony has a seating capacity of 878.

The building was designed by Mr. Albert E. Westover, architect and theatre specialist, of Philadelphia. Mr. F. Neil Brodie, of St. John, N.B., is supervising architect, and Mr. John Healy of Boston, inspector of works. The general contractor is H. L. Brown, of Philadelphia, while the sub-contractors are as follows: heating and ventilation, Philadelphia Steam Heating Co.; electrical work, Cates & Shepard, Philadelphia; plumbing, J. H. Doody, Jr., St. John, N.B.; painting and glazing, J. H. Pullen, St. John, N.B.; interior woodwork, Murray & Gregory, Ltd., St. John, N.B.; structural steel work, McKinnon, Holmes & Co., of Sherbrooke, Que.

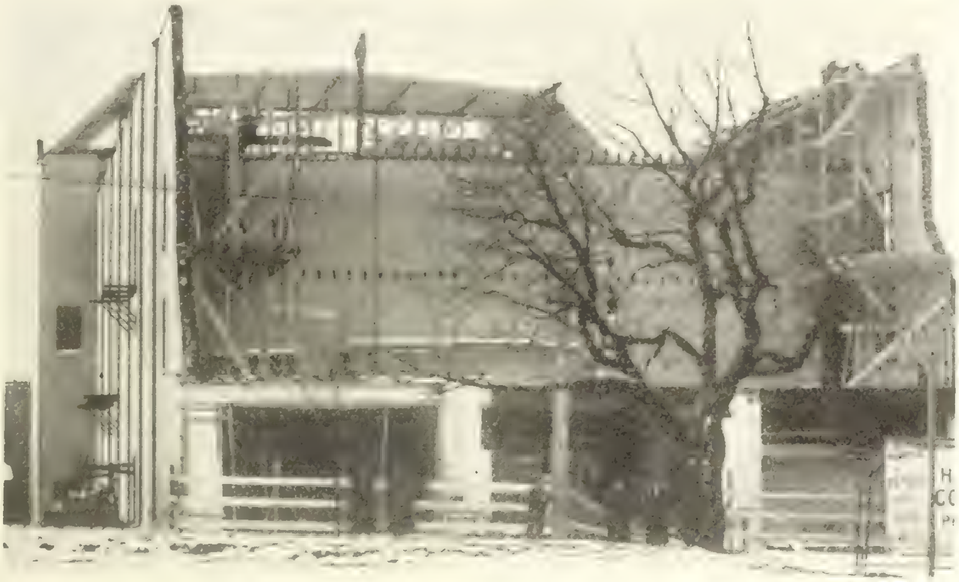
A land pile-driving machine, with a very wide transverse reach, is in use for a large amount of substructure work for the New York Central & Hudson River Railroad at Croton Landing, N.Y. A tower with leads 60 ft. or more in height is mounted on wheels running on transverse rails laid on a platform supported at the ends on two standard gauge flat cars; the flat cars run on longitudinal tracks on the surface of the ground. This arrangement gives the machine a quick and easy adjustment to command the entire area between the longitudinal tracks and permits piles to be driven accurately in any position between limits. The height of the tower and its clearance above ground provide for handling long piles and for moving over those already driven.

In erecting the 80-ft. sheet-iron smokestack at the new boiler plant of the Belle-Vernon-Mapes Dairy Company, Cleveland, Ohio, a 3-ton White motor truck was made to serve as a hoisting engine. The stack weighed nearly 4,500 lb. and had to be elevated to a masonry foundation 12 feet above the ground surface. A guyed mast was set up alongside the base of the stack; a cable, made fast to the stack, was carried through a pulley at the masthead, down to a second pulley near the ground and thence to the motor truck. The truck then was backed away from the mast and the stack hoisted until it could be swung around and lowered into position on its foundation. The whole operation consumed only a few minutes. The accompanying illustration shows clearly how the work was done.

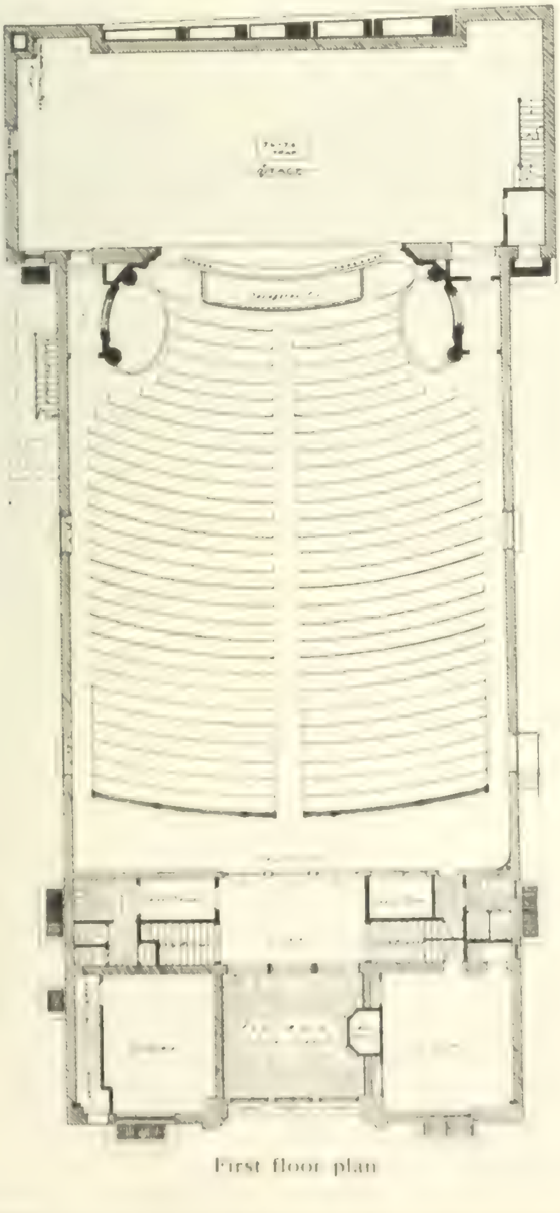
The reason that window panes are whitened in a building not yet completed is explained by a building contractor as reported in the New York Times, who says: "We don't plaster them over with chalk to prevent the public from seeing the unfinished condition of the interior, but to keep the workmen from battering out the glass. Transparent glass looks just about as transparent as air to the man who is moving a wooden or an iron beam in a hurry, and he is likely to ram the end of it through an expensive window, but when the glass is coated with white it becomes visible, and the workmen hand their material in through the door."

One of the largest dams in Europe was officially put in service on Nov. 16 in the presence of the German Emperor. The dam spans the Bober valley in the Prussian part of Silesia and forms with the dam at Marklissa the backbone of the high water protection project planned in 1900. It is 920 ft. long at the crest and 460 ft. at the base, 200 ft. high on an average, 24½ ft. thick at the crest and 164 ft. at the base. Cyclopean masonry amounting to 332,000 cu. yd. was used in the construction. The capacity of the reservoir is 1,760,000,000 cu. ft. and the area of the surface is 600 acres, forming a lake 5¼ miles long. Together with the necessary real estate purchases the cost of the dam was $2,450,000.

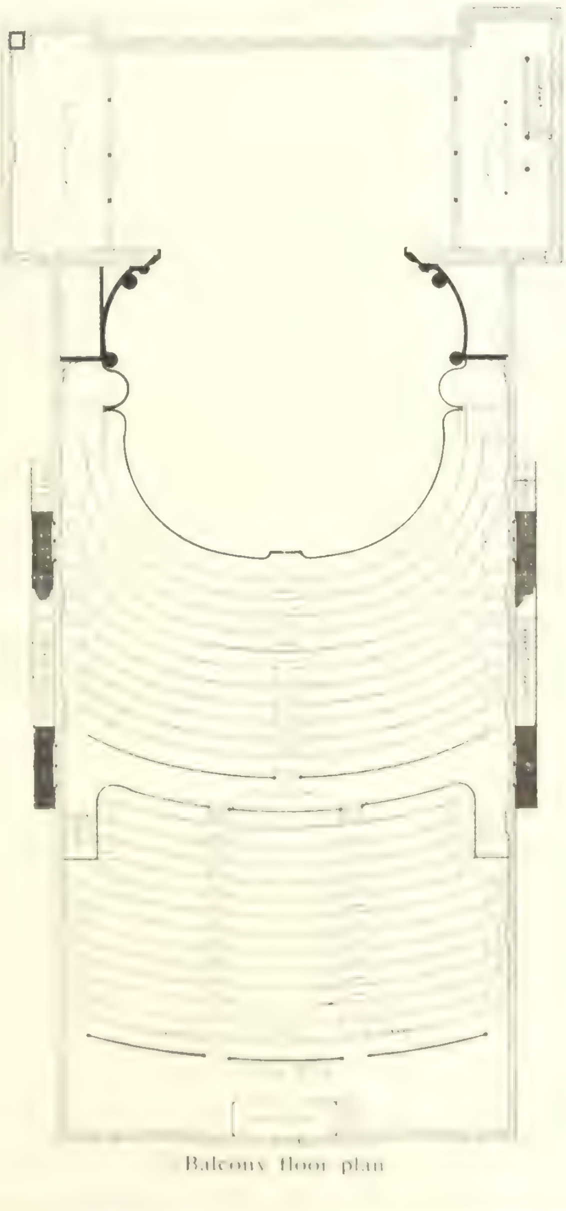
The government engineers in Java have recently constructed a road bridge more than 100 feet long, with a central span of over 60 feet, completely of bamboo. Even the road bed is composed of bamboo matting, covered with a layer of earth. The bridge resembles a steel structure in profile, but all the members are bamboo rods. It is estimated that such a bridge should last about 15 years.



Imperial Theatre, St. John, N. B., now nearing completion



First floor plan



Balcony floor plan

Asphalt Macadam Road Construction

Basic Principles Which Stand for Economy, Permanency and Low Cost of Maintenance — Specifications for Pouring and Mixing

By Louis Garbi, Jr.,* Montreal

THE need for good roads is now generally recognized and the problem of to-day is **How to Build Good Roads.** Parishes, municipalities, cities, provinces and governments all realize that **millions of dollars are saved to the farmers, manufacturers and merchants** through being enabled to haul their products to their respective markets at one-fifth to one-tenth the previous cost by having an improved highway, and that this is the best reason for spending money on good roads.

The problem, therefore, is to build a highway which, while not excessive in its first cost, yet provides a permanent way for all classes of vehicles and at the same time is not costly to maintain.

If all types are investigated and considered carefully, it will be found that theoretically and practically, John L. McAdam, years ago devised the most perfect highway. John L. McAdam, using the soil as he found it, added a layer of broken stone from the **nearest** local source, and the result was a road which could be travelled by vehicles in wet or dry weather. McAdam's methods were improved on by machinery, but always the fundamental principle was the same: to break the stone to usable sizes and reconstruct a layer of stone to as near the original rock as possible, in a layer of sufficient thickness to carry the traffic over the subsoil at the place of construction.

This fundamental idea withstood all variations of horsedrawn traffic and only became obsolete as the self-propelled vehicle was developed. The suction action of large **yielding** tires is to remove the finer particles or binder from among the stone in the macadam surface and thus expose the stone in the pavement to the action of traffic and the elements. As soon as the stone is in part or wholly exposed, then McAdam's fundamental principle has been destroyed. There is no longer a solid mass to meet conditions and disintegration at once takes place. **Therefore, it is necessary to protect the macadam against this action of high speed vehicles.** Thus the problem presented to engineers a few years ago was to combine McAdam's principles with some agent which would prevent the action of the pneumatic tire. Of the numberless materials which have been used in various types of pavements during the past decade, there is none equal to asphalt in its ability to withstand water, acids, alkalies, abrasion and temperature changes.

Materials such as tar products, so sensitive to heat and cold, cement, various alkalies, glucose, oils, and patented products are rapidly being discarded as fads. Engineers are recognizing generally that the one unchangeable material capable of withstanding all **weather** and **traffic** conditions, is a properly prepared, natural asphalt. The final problem is to combine McAdam's theory with the indestructible binding agent, asphalt. The result of this combination is the modern **asphalt macadam.**

There are two basic methods of constructing asphalt macadam: either by mixing the mineral parts with the asphalt or by coating the mineral particles in place on the road by penetration or pouring of the asphalt. Both methods are further elaborated by the use of a so-called "Flush" or "Squeegee" coat which is applied as a final seal or finish to the pavement.

In using the penetration or pouring method for asphalt macadam highways, the preliminary work is practically the same as that used in building a high grade water bound macadam, great care being exercised to see that the foundation course is smooth and absolutely firm. This point about the foundation being firm is one which should have a great deal of attention, because whereas in a water-bound macadam the creeping or heaving of the top course during the process of consolidation is not absolutely detrimental, in asphalt macadam the binding action of the asphalt tends to make the top course "spring" after each passing of the roller and in that way the road never can become firm with a yielding bottom course.

Finished surface of penetration macadam. Age two years. Note matted condition.

After the foundation presents a smooth, firm appearance, with no filler or dirt on the surface, a layer of **clean** top stone, varying in size from 1½ in. to 2 in., or 2 in. to 3 in., should be spread to a uniform depth over the foundation. This question of the size of the stone is not as vitally important as many engineers claim, except in this way that a practically uniform size is essential. That is to say, if the small stone run about 1¼ in. to 1½ in., then the larger stone should not be greater than 2½ in. and the depth of the top course on which this stone is used should not be greater than 2 in. after rolling. On the other hand, if the smaller stone is 2 in. in size, then the larger stone may run 3 in. and the depth of the course correspondingly increased so that the finished top will be 3 in. in depth.

The point is, that a wide variation in the size of the stone causes an irregular delivery. One load may run all fine and the next load all coarse stone. This **condition is absolutely detrimental to the paving.** If

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La Presse Road, St. Lambert. Penetration macadam before and after application of asphalt.

the stones are uniform in size and have a generally cubical fracture, the average size may be the large or small.

After the stone has been spread to a uniform depth to secure the depth of top course desired after completion, the roller is passed over the stone sufficient to give it 80 per cent. of the ultimate compression. That is to say, if 2½ in. of stone has been laid loose to roll to 2 in., the stone should be rolled to about 2⅛ in. in depth.

Of this stone which has been rolled and which now presents a smooth, clean appearance, prepared asphalt heated to about 375 deg. F. should be applied at the rate of 1½ or 2 gallons a square yard, depending entirely upon the depth of stone used and the type of traffic to be considered. It is safe to assume that, on the first application, three-quarters of a gallon per inch depth of rolled stone will give proper results.

Following the first application of the asphalt, stone chips of a size to fill the voids exposed should be spread uniformly over the road. If generally small stone, as from 1 in. to 2 in. in size, have been used on the first course, then one-quarter inch stone chips will fill the voids after the first application. On the other hand, if the stone vary in size from 2 in. to 3 in., stone chips averaging ¾ in. to 1 in. in size should be used.

The stone chips, which are spread just sufficiently in quantity to cover the road and permit the passing of the roller without the adhesion of the asphalt to the wheels, are then thoroughly rolled until the surface is uniform and hard. After the rolling, the road should have a black and white appearance in which small depressions of ⅛ in. to ¼ in. in depth appear.

Following the above operation another layer of asphalt should be applied. The quantity in this application should vary from ½ to ¾ of a gallon per square yard, depending as before on the size of stone used in the first application. After the application of the asphalt, screenings from ⅛ in. to ½ in. in size, clean, dry and free from dust, should be spread over the road to completely cover the surface in every part. Following the application of the screenings, the road is once more rolled, and by the aid of brooms and the adding of more screenings, an absolutely uniform, hard, smooth surface results. There should always be a slight excess of screenings when the road is first completed as the action of the hot weather combined with the traffic will soon cause these screenings to disappear into the roadway. The final result, when the road is properly built, is a smooth matted rubbery surface.

La Presse Road St. Lambert. Penetration macadam and application of asphalt

The so-called "mixing" or "asphalt concrete" method is, as the name indicates, a mechanical combination of a mineral aggregate with asphaltic cement.

This type of construction has caused a great deal of litigation and dispute owing to the fact that there is a certain patent covering the use of stone, and asphalt mixtures under certain specifications. However, it has been pretty well established that if the maximum size of stone used is not any greater than ½ in. and, furthermore, if less than ten per cent. is retained at ¼ in. screen, regardless of the method of grading of the mineral aggregate which will give the densest mixture, there is no infringement of the above mentioned patents. In connection with this question of patents on a mixture, it is interesting to quote an article by Professor A. H. Blanchard, of Columbia University, presented before the Washington meeting of the American Society of Civil Engineers, December 11th, 1911. Professor Blanchard states:—

La Presse Road, St. Lambert, after completion.

> "It has been admitted in writing by certain patentee that so long as the construction is of the nearly uniform size of stone which you are now using, and you do not get the material applied from the surface or into the spaces between the particles of bitumen-coated stone more than our observations indicate you are now doing, or we believe it is possible to do, we would not claim this feature of the construction to be an infringement of our patent No. 727,505.'

The construction referred to in the above quotation covers that of a wearing course of bituminous concrete pavement under the following specification relative to the broken stone:

> "The bottom course shall consist of stone from one and one-quarter (1¼) inches to two and one-half (2½) inches in their longest dimensions, the upper course of stone from one-half (½) to one and one-quarter (1¼) inches in their longest dimensions."

Only the upper course of stone was mixed with bituminous material. The product of the crusher which met this specification was obtained from the ordinary type of crushing plant, the broken stone usually passing a one and one half inch screen and [illegible] being retained upon a three-fourths or five-eighths inch screen. A mechanical analysis of a typical product used in Rhode Island may be of interest and hence is given below:

Per cent. passing	10 mesh sieve	1.0
—	¼-inch sieve	2.5
—	½-inch sieve	30.8
—	¾-inch sieve	34.2
—	1-inch sieve	23.4
—	1¼-inch sieve	8.1

In all instances where the mixing method is used it is desirable that a concrete base be supplied, although resurfacing an old macadam which through years of traffic has become absoultely unyielding may give satisfactory results. The most pronounced example of the re-surfacing type is the Lincoln Park work at Chicago, than which probably there is no finer example of asphaltic concrete paving to-day.

For the information of engineers, who contemplate asphalt macadam work, herewith is given the specification for penetration asphalt as used by the province of Quebec, on the King Edward Highway. Also, there will be found specifications for mixing work as used by the Borough of Queens, New York City.

Specifications for Asphalt Macadam Roadways

(Penetration or Pouring Method)

Analysis of Asphalt Binder

The asphalt cement shall be prepared from a crude natural asphalt containing not less than 99 per cent. bitumen soluble in carbon disuphide. It must be homogeneous, free from coal tar, and conform to the following analysis:—

(1) The specific gravity of the asphalt at 25 deg. C. (77 deg. F.) shall not be less than .965 or over 1.0.

(2) It shall be soluble in carbon bisulphide to the extent of 99.0 per cent. and between 75 per cent. and 82 per cent. of the bitumen soluble in carbon bisulphide shall be soluble in petrolic ether (88 deg. Beaume).

(3) There shall not be less than five per cent. or more than ten per cent. of fixed carbon by the method described for coal in the Journal of the American Chemical Society, 1899, Vol. 21, page 1,116.

(4) When 20 grams of the asphalt are maintained at a uniform temperature of 170 deg. C. for five hours in a cylindrical vessel, 2¼ inches in diameter, there must not be volatilized more than 3 per cent. by weight.

(5) Melting point by test recommended by American Society of Civil Engineers, shall be not less than 110 deg. F. or over 140 deg. F.

(6) Flash point by New York State closed oil tester shall be not less than 375 deg. F.

(7) The asphalt at 0 deg. C. (32 deg. F.) must not become brittle and shall be within the following penetration limits:

No. 2 N. 100 gms. 5 sec. 25° C. (77° F.) 150 to 200.
No. 2 N. 200 gms. 1 min. 0° C. (32° F.) 90 to 130

BOROUGH OF QUEENS SPECIFICATIONS

For Asphaltic Concrete Pavement

Asphalt Cement

The asphaltic cement used in cementing the mineral aggregate shall consist of a refined natural asphalt or with an approved flux (one which is not a by-product of the oil refining industry, but which is manufactured solely for paving purposes and carefully distilled at a temperature that will not injure the asphalt), and shall be similar in character to that used in the construction of sheet asphalt pavement. The asphaltic cement shall satisfactorily comply with the following requirements:

1. Its specific gravity shall be greater than .975 at 77 degrees F.

2. It must have a penetration between five and ten millimeters at 77 deg. F. under 100 grams for five seconds, and must not be harder than 1 millimeter penetration at 32 deg. F. under 200 grams for one minute.

3. The cement shall be practically free from water, decomposition products, coke or inert free carbon, coal tar or any of its products, or other injurious matters, and the various hydro-carbons composing it shall be present in homogeneous solution, no granular constituents being present.

4. It must not flash below 350 deg. F. when tested in a New York State closed oil tester.

5. Twenty grams of the cement upon being maintained at a uniform temperature at 325 deg. F. for five hours in a cylindrical vessel 2½ inches in diameter, shall not lose more than two per cent. in weight, and the penetration of the residue shall not be less than one-half that tested above described.

6. It shall be soluble in chemically pure carbon disulphide at air temperature to the extent of at least 95 per cent.

7. Of the bitumen of the asphalt cement which is soluble in carbon disulphide at least 98½ per cent. shall be soluble in carol carbon tetrachloride.

8. The bitumen of the cement shall be soluble in 76 degrees Baume petroleum naphtha, at air temperature to the extent of not less than 72 per cent.

Penetration macadam, Sorel, Que. Note loose screening shortly after completion

9. Upon ignition, the bitumen of the cement shall yield not less than 9 per cent. nor more than 15 per cent. of fixed carbon or residual coke.

10. When tested for ductility at 77 degrees F., a briquette of pure bitumen of the asphalt cement having a minimum cross section of one centimeter square, must elongate to a distance of more than two centimeters before breaking (Dist. of Columbia Method).

All tests shall be made by uniform methods and must be satisfactory to the engineer. All percentages are by weight unless otherwise specified.

Mineral Aggregate

On the prepared macadam foundation shall be spread the asphalt concrete which shall be composed of materials and mixed in proportions as follows:

Asphaltic cement, from 7 to 11 per cent.

Mineral aggregate passing 200 mesh screen, from 5 to 11 per cent.

Mineral aggregate passing 40 mesh screen, from 18 to 30 per cent.

Mineral aggregate passing 10 mesh screen, from 25 to 55 per cent.

Mineral aggregate passing 4 mesh screen, from 8 to 22 per cent.

Mineral aggregate passing 2 mesh screen, less than 10 per cent.

Sieves to be used in the order named.

After ultimate compression, the pavement shall have a thickness of at least two (2) inches.

The mineral aggregate used in making the asphaltic concrete shall consist of suitably screened, hard, durable crushed stone or washed gravel, of sizes and percentages called for in the specifications above. The variation in percentages shall be used to the best advantage to obtain the densest pavement possible thereunder, and the resulting pavement when laid, shall not be so soft as to be unfit for travel on the hottest days of summer or so hard as to disintegrate in the coldest weather.

Modern Methods of Sewage Disposal*

By J. Darlington Whitmore

SEWAGE Dsiposal methods rightly commence on the property of the producer and I therefore propose to glance lightly over an imaginary scheme, commencing at an imaginary household and following the sewage to its reception and treatment at the disposal works.

I shall not in this present paper deal with other than water borne sewage; the outside closet and privy, etc., together with the objectionable methods of emptying and cleansing same, being thoroughly familiar to us all.

As you are all no doubt aware, the close of the year 1909 saw the ratification of a very excellent Public Health Act for this province, patterned largely upon the laws and regulations enforced by the various local government boards of Great Britain, and controlling the methods of sewage disposal and water supply, as also the pollution of streams and waterways.

The authority is vested in a "Bureau of Health" acting for the government and having a duly qualified medical man at its head as Commissioner, who in turn has a sanitary engineer on his staff to advise with him on the various questions that arise.

No scheme for water supply, sewage disposal or sewerage can now be constructed in this province without the sanction of this body, and as time passes and the various plants now completed or under construction some into use, much valuable information will be obtained, and a careful record of regular tests and analyses at the various works will further enlarge our knowledge of this subject and enable us to take a seat in the forefront in the vexed question of the efficient sanitary disposal of sewage.

Plumbing

Commencing with the household our first step in connection with sewage disposal is to install satisfactory plumbing whereby the liquid wastes and faecal matters are quickly passed away into the sewers without causing any nuisance to the occupiers of the premises. It has been abundantly proved that, where perfect ventilation in the plumbing system does not exist, the foul gases generated by the sewage and ever present in the pipes will force their way through the water seal of the traps to the interior of the dwelling with a consequence of disease and sometimes death to those persons inhaling the impure mixture. It is therefore absolutely necessary to arrange for perfect ventilation to the whole system and in each case all traps should be well vented with efficient vent pipes and every fixture should be trapped.

The system in vogue for many years of placing an intercepting trap on each individual system, thereby separating the house plumbing from the sewers, has not borne out the expectations conceived for it and the majority of new systems being or to be installed will be without this fixture. The idea governing the adoption of the intercepting trap was to exclude sewer gases in the main sewers from rising into habited premises and also to prevent the ingress of rodents; each separate plumbing system was then vented on the house side of the intercepting trap, and it was for a long time considered that the acme of plumbing ventilation had been achieved. A short vent pipe was connected with the house system close to the intercepting trap, generally in a manhole, while the main soil pipe was continued up above the roof; the idea being that the short pipe would always act as an inlet and the long one as an outlet.

This theory was, however, soon exploded, it being discovered that both long and short pipes acted alternately as inlet and outlet, depending upon changes of wind, temperature, etc., and, as the short pipe was always at the lower end of the system, extremely foul odors were often discharged at most dangerous points to passing pedestrians, and, where open windows or doors were near the supposed inlet, the malicious influence of the sewer air soon became only too well manifest.

To overcome these difficulties at the supposed inlet end various valves were made, the chief kind being fitted with a mica flap to allow air to enter from outside but to prevent foul air emanating from within; the success attending the adoption of these expedients was but meagre and unsatisfactory and the adoption of this system cannot be recommended.

Personally I consider that efficient plumbing in the interior of dwellings should be as follows: The soil, waste and vent pipes should be of iron, with the caulked lead joint, all fixtures such as baths, sinks, closets, grease traps, etc., should be of porcelain, and through ventilation with the main sewers be always acting; all traps to all fixtures being vented into either a seperate anti-syphonage pipe or into the main soil pipe well above the highest fixture; further, the soil pipe should be carried up well above the ridge of the roof and should discharge clear of all chimneys or open windows.

To be certain of satisfactory and air tight joints in the plumbing at least two tests are necessary, the hydraulic and smoke test. The hydraulic or roughing in test is applied before the fixtures are installed; the pipes including soil, waste and vents being filled with water and allowed to stand a reasonable time; after this test is satisfactorily accomplished and any faults made good, the fixtures are placed, and a smoke test of sufficient pressure so as just not to break the trap seals is further applied; the plumbing after satisfactorily passing these two tests being ready for use.

Sewers

The sewers can be of either concrete, vitrified tile, vitrified brick or other impervious and smooth construction and should be so designed as to grade and size as to be self cleansing. The velocities of the sewage through the sewers should range from two to six feet per second when flowing half full, and wherever possible should flow by gravity without the aid of pumping. Where, owing to the topography of the ground lifting is necessary it can be accomplished either by some of the various automatic devices on the market or by centrifugal pumps; reciprocating or

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*Paper presented before the Pacific Engineering Society.

[illegible] pumps are not satisfactory for this purpose owing to the excessive wear on the valves and pistons, etc.

In this province the tendency is towards the separate system, the storm water being carried in separate pipes, the advantages of the separate system being that the disposal works can be designed to deal with a known quantity of sewage and much of the expense and uncertainty attaching to combined systems is thus eliminated.

The ventilation of the sewers is an important feature and should be achieved by through ventilation with all house or other connections, every separate house connection being connected to the main line and thus permitting a free flow of air from the sewers through the house plumbing to the outer air or vice versa. It is only reasonable that each householder contaminating the sewers should also provide a means of ventilating them, and without a doubt this offers the best method of ventilation providing the soil pipes are carried up well above the ridge of the roof of any dwelling, and the plumbing is kept in good condition, for which safeguard a compulsory yearly inspection of the plumbing would be advisable. The practice of ventilating the sewers at the street level through perforated manhole covers as adhered to by many cities and towns, cannot be too strongly condemned, the nuisance arising from such methods being too palpable to the senses of sight and small. Up to within about eight years ago I was a firm advocate of the intercepting trap and the ventilation of sewers at the street level, but later observation has changed my views, and I do not consider that any community adopting these methods today can be considered as otherwise than behind the times and disregardful of the most obvious laws of health.

Any one who has walked along the streets of a city or town where the sewers have been ventilated at the street level must have noticed in winter the dense unhealthy vapor that arises, and in summer they cannot have failed to have become convinced through their olfactory nerves of the monstrosity of this method and its great menace to health and life. The inhalation of sewer gas will not of itself bring disease unless the sewage is sprayed in it, but it will undoubtedly lower the vitality of the human frame, and so render the body subject to speedy capitulation to the many forms of disease that we humans are heir to. By ventilating the sewers through the house plumbing the obnoxious gases are carried well up into the air above the roof tops, each house system acting alternately as inlet or outlet, dependent upon the direction of the wind or degree of temperature, and thus carried far away and purified by dilution.

Disposal Works

The aim of the provincial authorities is to prevent any septic action taking place at the disposal works, and with this end in view the ordinary septic tank is not countenanced, but plain sedimentation has been enforced in all the systems designed under the new Act up to the present time. This is a very laudable ambition, as a non-septic effluent can be better treated on the bacteriological filters than can a septic fluid, but I do not see how these conditions are to prevail all the year round with our present designs taking into consideration the extreme severity and duration of our winter months.

Beginning with the freeze-up in November our winters may be said not to terminate till well on into April, and during that period, we experience temperatures as low or lower than 50 degrees below zero. During this period of low temperature, it does not appear to me to be either advisable or feasible to empty the sludge from the sedimentation tanks on to the sludge beds as even if the sludge were thus deposited it would freeze into a solid mass and thus neither drain nor dry, whilst it is more than probable that the sludge pipes leading from the sedimentation tanks to the sludge beds would, when operated, quickly become frozen and fail to accomplish their object.

With fresh frozen sludge being deposited on the sludge beds from time to time during the winter a great mass would accumulate which would take a long time to drain and dry after the winter was over, if it ever did dry, and I am afraid would materially interfere with and retard the successful operation of the plant. If on the other hand the sludge is allowed to remain collecting in the sedimentation tanks during the winter months, it will become septic, and the professed object of the provincial authorities will not be obtained with the sedimentation tanks as at present designed.

Fresh sludge from a sedimentation tank contains from 90 per cent. to 95 per cent. water, whereas sludge that is septic contains only 80 per cent. water; it is therefore easy to understand that the removal and subsequent treatment of septic sludge entails much less labor and costs considerably less than that of fresh sludge.

Having in mind the duration and severity of our winters and the difference in volume of fresh wet sludge as against wet septic sludge, I am in favor of a tank so designed that the sludge can be retained for long periods and become septic without coming into long contact with the effluent passing through the tank, and the Emscher tank apparently complies with these requirements with its deep sludge well accommodation.

Septic sludge being viscous and denser than fresh sludge is much easier to handle, and both drains and dries quicker, becoming under normal conditions spadable in about five days after being spread upon the drying beds, whereas fresh sludge is very sloppy owing to its large content of water and does not become spadable in less than fifteen to twenty days under similar conditions; it has also a tendency to clog and choke the drainage material of which the sludge beds are composed.

In many of the larger European plants the sludge is drained and dried in pressing machines and centrifuges and afterwards pressed into cakes and used for manure on farm lands, or as fill in low lying ground or sometimes burnt; the grease is also cometimes extracted and sold, but up to the present at a financial loss in most instances. The sludge has but little value as manure and in many cases farmers or others have demanded and obtained payment for removing it from the works.

Personally I am of the opinion that in this province where farmers have not yet attempted to manure the land, that the best and most satisfactory method of disposal of sludge is to burn it in an incinerator after it has been dried upon the sludge beds to a consistency of about 50 per cent. moisture, in which condition it is easily spadable. For the smaller communities that do not possess garbage incinerators, the dried sludge can be buried in shallow trenches reserved for this purpose adjoining the disposal works.

I have spoken at some length on the sludge question, as it is undoubtedly the most troublesome feature to deal with in the modern system of sewage disposal for inland communities, and there is a good sized fortune in store for that individual who can discover some better and more sanitary and economical method of sludge disposal than that which prevails to-day.

Whilst speaking of the sludge it occurs to me that up to the present no attempt has been made to control the fly nuisance that will arise whilst the sludge is being drained and dried upon the beds. Residual oils sprayed upon the sludge will eflectually prevent the fly evil, but at the same time will considerably retard the drying process, and on that account may not be advisable. For my part I would favor the construction of a cheap framing around the sludge beds; the openings between the uprights being filled in with wire mosquito netting and the top roofed over with shingles, the sides having doors for the ingress and egress of the workmen for removing the dried sludge. This construction would confine the flies to the sludge beds and prevent their wandering into human habitations, and at the same time would allow free access of light and air whilst excluding the rain; the flies could be exterminated from time to time by smoke or other methods.

The severity of our winters has made it debateable as to whether the filters will, without the aid of artificial heat, freeze during the winter months, and to overcome this tendency the sedimentation tanks and filter beds have, where possible, been designed under one roof and practically within one enclosure in the hope that the latent heat in the fresh sewage will be sufficient to counteract the frost.

From my personal observations at the septic tanks at Moose Jaw, extending over a period of five years, I found that the temperature of the blanket in the tanks ranged from 40 to 45 degrees Fahr.; the lower temperature being recorded when the air outside the tank registered 40 degrees or more below zero Fahr.; the tanks being of reinforced concrete construction roofed in and covered with a dirt fill of at least two feet on the crown of the arch and increasing towards the haunches and walls. It remains to be seen whether the latent heat of the sewage will be sufficient to overcome the tendency to freeze in the filters, and I am inclined to the belief that it will, providing proper care is observed in their construction with a view to keeping out the frost. Should the filters, however, show signs of freezing artificial heat will have to be resorted to with its attendant additional outlay and expense.

It is of course understood that in locating a site for a sewage disposal plant, the topography of the land be well studied with a view to the avoidance of pumping with all its attendant heavy costs, that it be placed as far from the community it serves as possible, and so that the prevailing winds shall carry the odors that will arise, even in the best of plants, away from the city or town.

With this digression I will proceed to describe my imaginary disposal works, which will be typical of those installed in the province up to the present time in conformity with the requirements of the Bureau of Health.

Upon the arrival of the sewage at the works it is received in a screening chamber, passed on into a detritus chamber, thence into a sedimentation tank or system of tanks, from whence it is distributed over bacteriological filter beds, and after emerging, passed into a humus tank where it can be disinfected if necessary before being finally disposed of.

Screening Chamber

The screening chamber is a small rectangular compartment fitted with bar screens spaced about half an inch apart; the bars being of wrought iron and of 1¼ x ½ inch section; in this chamber all foreign substances such as sticks, flannels, scrubbing brushes, corks, matches, hair, etc., are caught and retained and periodically removed and buried or burnt.

Detritus Chamber

The detritus chamber is rectangular in shape and placed between the screening chamber and the sedimentation tank, being really part of the tank, its capacity is from 3 per cent. to 5 per cent. that of the tank and its functions that of intercepting the heavier mineral matters in the sewage during its passage to the tank. Were we sure that no sand or other mineral matter would find its way into the sewage, the detritus tank would not be necessary with our separate system of sewage, but we cannot always guarantee that the joints in the tile sewers will remain perfect and it is considered advisable to exclude these substances from the sludge of the sedimentation tanks. The accumulation of the detritus is removed at regular intervals through sludge pipes placed at the bottom of the tank, and is subsequently dried and buried.

Sedimentation Tank

From the detritus chamber the sewage flows over a long weir into the sedimentation tank by means of a submerged inlet, the tank being so designed as to obtain a large sedimentation of the organic matter in the sewage with a continuous flow of the effluent to the filters. The velocity of the sewage where it enters the screening chamber is three feet per second, but in the tank it is reduced to one sixty-fourth of an inch per second, which gives us practically quiescent sedimentation with a continuous flow. The effluent passes out to the collecting channel through submerged outlets, and no scum boards are used as their adoption tends to set up currents in the tank.

The tank I have in mind is divided into two compartments and so controlled by valves that either compartment can be used or thrown out of commission at will, thus enabling us to treat the sewage with different durations of contact, or to empty one division for inspection or cleansing at any time without disorganizing the operation of the works. The walls and floor are trowelled smooth, the latter having a slope of one in fifteen to the shallow sludge pits, to facilitate the gravitation of the sludge. The rate of flow through the tank is four and three hours respectively so that if desired for experimental purposes rates of flow of three, four and seven hours can be obtained. The amount of dried sludge extracted from the tank per capita per day is approximately two ounces, depending of course largely upon the habits of the persons contributing to the sewage and as this is increased in bulk nineteen or twenty times by the large amount of water mixed with it, being approximately in the mass 90 degrees to 95 degrees water, weekly extraction of the sludge is necessary to keep the effluent fresh.

For this purpose sludge pipes controlled by cone shaped valves are carried from the bottom of the shallow sludge pits to the sludge beds, where the sludge is regularly deposited and dried during the seasonable months.

The tank is easy of approach and is fitted with gangways inside so that inspection is at all times easy and can be accomplished without climbing down dark and dirty manholes, or soiling the hands or clothing. The tank is of reinforced concrete and roofed in as is indeed all the other parts of the plant, and a thermometer is kept constantly suspended in the sewage to show the degree of temperature. The outlet of the tank is fitted with a measuring weir so that the production of sewage can be tabulated and recorded.

Bacteriological Filter

After passing the measuring weir, the clarified effluent is conducted by a main channel running lengthwise along the centre of the filter, from which subsidiary channels branching off at right angles lead it to a system of Stoddart Trays by means of which it is distributed over the filtering material in the form of a fine spray. The trays discharge at three inches above the filter so that no splashing occurs and are laid perfectly level by means of thumb screws affixed to wrought iron chairs. This method gives a very satisfactory distribution of the effluent and the Stoddart Trays have the added advantage of requiring but little attention. The filtering medium is composed of three inch crushed stone well screened and free from dust, and has an average depth of 8 feet [illegible] rate of 150 Imperial gallons per cubic yard per 24 hours.

The floor of the filter is of concrete, trowelled smooth with a fall of 1 in 30 towards the centre channel, where the filtered effluent is collected and discharged. Upon the floor rocks of about 9 inch to 12 inch section are laid to admit of free passage of air and easy drainage, the [illegible] an efficient circulation of air through the filter is further [illegible] above the ground a set of [illegible] which discharge into the base of the [illegible] spaced at [illegible] foot intervals longitudinally around the walls.

The roof of the filter is further fitted with ventilators for discharging the air, so that good aeration and ventilation are obtained. Sunlight is admitted through windows in the roof which are kept open in the summer and closed during winter. The action of this style of continuous filter [illegible] and the degree of purification obtained about 98 per cent.

All operating parts of the filter are of easy and comfortable access and an arched passage way runs along the centre of the filter for its full depth, so that inspection of the collecting channel is obtainable at all times with the aid [illegible]

Disinfecting Channel

From the filter the now considerably purified effluent is conducted into a long, rectangular channel fitted at intervals with baffle plates where if the circumstances so demand it is disinfected by a minute solution of calcium hydrochloride which by means of the baffle plates is thoroughly incorporated into the effluent, and the whole aerated.

Humus Tank

From the disinfecting channel the effluent flows into a rectangular tank of shallow depth, divided into two longitudinal sections, where it deposits any humus that it may have carried with it during its progress of purification, and from thence is discharged into a small watercourse in a non-putrescible condition, dangerous neither to animal nor fish life. The tank is fitted with an overfall weir and also floating arms, and one division can be thrown out of use and cleaned whilst the other is operating. The time of the passage through the tank is twenty minutes to allow of sufficient period for the disinfectant to act.

Sludge Drying Beds

The sludge drying beds are rectangular in shape, with wide passage ways for the convenience of the workmen who attend to the duties of spreading and drying the sludge and afterwards removing it.

The floors and walls are of reinforced wire mesh concrete to take up the thermal changes, and the floor is laid with a fall of one in ten to the centre to facilitate drainage. Upon the floor are placed diagonal rows of 4 inch open tile pipes connecting with and discharging into the main connecting channel. Upon these 18 inches of coarse gravel or crushed stone is placed, surmounted with a six inch covering of medium sized sand grains, making a total thickness of straining material of 24 inches.

The sludge from the sedimentation tanks and detritus chambers is gravitated to this bed in 9 inch diameter cast iron pipes, and is conducted along the beds in half open channel pipes, from whence it is spread evenly upon the beds in six inch layers by the workmen and left to drain and dry. The liquid draining from the fresh sludge is highly putrescible, in contradistinction to that from septic sludge which is not putrescible, and is conducted by means of the subdrains mentioned to pipes which convey it back to the sedimentation tanks for further treatment. The sludge after being dried until it becomes spadable is removed and buried in shallow trenches upon land reserved for the purpose adjacent to the disposal works.

Conclusion

I regret that the time at my disposal in preparing this paper has not been sufficient to enable me to prepare any drawings to illustrate my remarks, but I sincerely trust that I have made the various stages of sewage disposal operation sufficiently vivid by word pictures to counterbalance that defect.

The system explained is, as before stated, emblematical of all the new plants so far installed in this province, the only important difference being that the plants at the cities of Regina and Saskatoon have been fitted with revolving sprinkler apparatus for distribution of the effluent upon the filter beds.

In conclusion I would impress upon you that no modern sewage disposal plant, however, well designed, is fool proof, and the success of each individual installation is largely dependent upon the care and skill of the attendants. A log should be kept daily of all the happenings at the works and complete records of temperatures, volumes and analyses.

A Proposed Code of Ethics for Engineers

THE committee appointed by the Council of the American Society of Mechanical Engineers to prepare a code of ethics for adoption by that society, recently rendered a draft of a proposed code, which it recommended should be submitted to the society's membership in advance of its adoption, to give opportunity for discussion and criticism.

In submitting its report to the Council, the committee urged that eventually such a code should be adopted by all the national engineering societies for the guidance of their members, and further, that since the same ethical standards and principles should be observed in all branches of the profession, eventually the societies should agree upon a uniform code.

In drafting the present code, the committee has endeavored to make it applicable to engineers generally and not to the special field of the mechanical engineer alone. The code follows:

A. General Principles

1. It is not assumed that this code shall define in detail the duties and obligations of engineers under all possible circumstances. It is an axiom that engineers in all their professional relations should be governed by principles of honor, honesty, strict fidelity to trusts imposed upon them and courteous behavior toward all. The following sections are framed to cover situations arising most frequently in engineers' work.

2. It is the duty of engineers to satisfy themselves to the best of their ability that the enterprises with which they become identified are of legitimate character. If an engineer after becoming associated with an enterprise finds it to be of questionable character, he should sever his connection with it as soon as practicable, avoiding in so doing reflections on his previous associates.

B. The Engineer's Relations to Client or Employer

3. The engineer should consider the protection of a client's or employer's interests his first obligation, and therefore should avoid every act contrary to this duty. If any other consideration, such as professional obligations or restrictions, interfere with his meeting the legitimate expectation of a client or employer, the engineer should so inform him.

4. An engineer cannot honorably accept compensation, financial or otherwise, from two or more parties having conflicting interests without the consent of all parties. The engineer, in whatever capacity, whether consulting, designing, installing or operating, must not accept commissions, directly or indirectly, from parties dealing with his client or employer.

5. An engineer called upon to decide on the use of inventions, apparatus or anything in which he has a financial

interest, should make his status clearly understood by those employing him.

6. An engineer in independent practice may be employed by more than one party, when the interests of the several parties do not conflict; and it should be understood that he is not expected to devote his entire time to the work of one, but is free to carry out other engagements. A consulting engineer permanently retained by a party, should notify other prospective clients of this affiliation before entering into relations with them, if, in his opinion, the interests might conflict.

7. Before any consulting engineer takes over the work of another consulting engineer he should ask the client his reasons for desiring to change engineers, and unless the consulting engineer is entirely satisfied that the client has good and sufficient reasons for making the change he should confer with the present incumbent before accepting the work.

8. Consultations should be encouraged in cases of doubt or unusual responsibility. The aim should be to give the client the advantage of collective skill. Discussions should be confidential. Consulting engineers should not say or do anything to impair confidence in the engineer in charge unless it is apparent that he is wholly incompetent or the interests of the profession so require.

9. Engineers acting as experts in legal and other cases in making reports and testifying, should not depart from the true statement of results based on sound engineering principles. To base reports or testimony upon theories not so founded is unprofessional.

10. An engineer should make every effort to remedy dangerous defects in apparatus or structures or dangerous condition of operation, and should immediately bring these to the attention of his client or employer. As failure of any engineering work reflects upon the whole profession, every engineer owes it to his professional associates as well as to himself that a reasonable degree of safety be provided in all work undertaken.

C. Ownership of Engineering Records and Data

11. It is desirable that an engineer undertaking for others work in connection with which he may make improvements, inventions, plans, designs or other records, should first enter into an agreement regarding their ownership.

12. If an engineer uses information which is not common knowledge or public property, but which he obtains from a client or employer, resulting in plans, designs or other records, these should be regarded as the property of his client or employer.

13. If a consulting engineer uses only his own knowledge or information which by prior publication, or otherwise, is public property and obtains no engineering data from a client or employer, except performance specifications or routine information; then in the absence of an agreement to the contrary, the results in the form of inventions, plans, designs or other records should be regarded as the property of the engineer, and the client or employer should be entitled to their use only in the case for which the engineer was employed.

14. All work and results accomplished by an engineer in independent practice in the form of inventions, plans, designs or other records, which are outside of the field of engineering for which a client or employer has retained him, should be regarded as the engineer's property unless there is no agreement to the contrary.

15. When an engineer or manufacturer builds apparatus from designs supplied to him by a customer, the designs remain the property of the customer and should not be duplicated by the engineer or manufacturer for others without express permission. When the engineer or manufacturer and a customer jointly work out designs and plans or develop inventions a clear understanding should be reached before the beginning of the work regarding the respective rights of ownership in any inventions, designs or matters of similar character that may result.

16. Any engineering data or information which an engineer obtains from his client or employer, or which he creates as a result of such information, must be considered confidential by the engineer; and while he is justified in using such data or information in his own practice as forming part of his professional experience, its publication without express permission is improper.

17. Designs, data, records and notes made by an employee and referring exclusively to his employer's work, should be regarded as his employer's property.

18. A customer, in buying apparatus, does not acquire any right in its design, but only the use of the apparatus purchased. A client does not acquire any right to the plans made by a consulting engineer except for the specific case for which they were made, unless there is an agreement to the contrary.

D. The Engineer's Relations to the Public

19. The engineer should endeavor to assist the public to a fair and correct general understanding of engineering matters, to extend the general knowledge of engineering, and to discourage the appearance of untrue, unfair or exaggerated statements on engineering subjects in the press or elsewhere, especially if these statements may lead to, or as made for the purpose of, inducing the public to participate in unworthy enterprises.

20. Technical discussions and criticisms of engineering subjects should not be conducted in the public press, but before engineering societies or through technical publications.

21. It is desirable that the first technical descriptions of inventions or other engineering advances should not be made through the public press, but before engineering societies or through technical publications.

22. It is unprofessional to give an opinion on a subject without being fully informed as to all the facts relating thereto and as to the purposes for which the information is asked. The opinion should contain a full statement of the conditions under which it applies.

23. Engineers engaged in private practice should limit their advertising to professional cards and modest signs in conformity with the practice of other professions.

E. The Engineer's Relations to the Engineering Fraternity

24. The engineer should take an interest in and assist his fellow engineers by exchange of general information and experience, by instruction and similar aid, through the engineering societies, the engineering schools or other means. He should endeavor to protect all reputable engineers from misrepresentation.

25. The engineer should take care that credit for engineering work is attributed to those who, so far as his knowledge of the matter goes, are the real authors of such work.

26. Criticism of the work of one engineer by another should be broad and generous with the facts plainly stated. The success or failure of one member reflects credit or discredit on the whole profession.

27. The attitude of superiors toward subordinates should be that of helpfulness and encouragement. The attitude of subordinates to superiors should be one of loyalty and diligent support. The treatment of each by the other should be open and frank.

28. The attitude of an engineer toward contractors should be one of helpful co-operation. Tact and courtesy should be combined with firmness. An engineer should hold a judicial attitude toward both parties to a contract for the execution of which he is responsible.

29. An engineer in responsible charge of work should not permit non-technical persons to over-rule his engineering judgments on purely engineering grounds.

Canada's Great Building Record of 1912

Thirty-Seven Cities and Towns Rolled up a Total of Nearly One Hundred and Eighty-Six Million Dollars

THE building expenditure of thirty-seven of the principal cities and towns of the Dominion for 1912 reached the large sum of $185,898,535, this representing a proportionate increase of 41 per cent. over the corresponding returns for 1911. Toronto heads the list with a total of $27,401,761. The highest percentages of increase among the cities are held by Edmonton (293), Victoria (104), Medicine Hat (282), Maisonneuve (125), and Port Arthur (319). Of the first ten cities in the list, three expended more than twenty million dollars each, the next two more than nineteen million dollars each, and the rest more than five million dollars apiece.

In comparing the returns with those of 1911, it is interesting to note the changes that have taken place in the positions of the "runners-up." Toronto's supremacy is likely to remain unchallenged for some years, and so the first position is established, but there is not the same stability attached to the second, third, fourth and fifth positions in the roll of honor. Last year, Vancouver, which occupied second place in the 1911 returns, dropped from second to fifth place. Winnipeg improved her position a point. Calgary, with an expenditure of over twenty millions and a percentage of increase of 58, jumped from fifth place to third, incidentally beating Montreal and running neck-and-neck with Winnipeg.

There are many noteworthy features in connection with the returns. Of these perhaps the most outstanding is the almost entire absence of losses. In the whole list of thirty-seven cities, decreases are recorded in only two, namely, Westmount and Guelph, where in the former case the figures are practically station-

City or Town	Dec. 1912	Dec. 1911	12 mos. 1912	12 mos. 1911	Increase per cent
Toronto	$1,936,685	$1,791,032	$27,401,761	$24,374,539	12
Winnipeg	469,450	206,350	20,475,350	17,716,750	16
Calgary	1,033,560	698,160	20,394,220	12,907,638	58
Montreal	684,675	622,422	19,641,955	14,579,952	35
Vancouver	1,530,365	1,592,465	19,428,432	17,652,642	10
Edmonton	680,532	74,735	14,446,819	3,672,260	293
Victoria	742,855	242,350	8,208,155	4,026,315	104
Regina	2,209,675	71,230	8,047,309	5,099,340	58
Saskatoon	82,125	134,125	7,640,530	4,960,286	54
Hamilton	231,100	92,300	5,491,800	4,255,730	29
Fort William	572,960	589,250	4,211,285	3,077,860	37
Ottawa	199,800	195,060	3,621,850	2,997,610	21
Medicine Hat	70,480	17,905	2,836,239	743,272	282
Maisonneuve	82,900	55,150	2,685,828	1,195,120	125
Port Arthur			2,494,179	595,180	319
Westmount	82,100	36,160	1,824,369	1,974,670	8*
New Westminster	55,150	60,900	1,634,528	1,124,587	45
Outremont			1,582,000	1,317,700	20
Lethbridge	69,805	102,740	1,358,250	1,033,380	31
St. Boniface	8,400	102,550	1,251,012	1,131,735	11
[illegible]			1,167,105	623,860	90
Brandon	27,700	1,925	1,166,214	1,024,529	14
[illegible]	27,263	187,553	1,136,108	1,036,880	10
Windsor	80,000	81,150	1,098,063	739,515	48
Berlin	5,195	7,795	842,613	358,095	135
St. Catharines			811,335	265,435	206
Sydney	4,840	9,000	656,111	495,642	32
Kingston	10,465	3,311	645,774	314,569	105
Halifax	38,350	98,000	579,775	508,836	14
Galt	21,115	103	506,130	282,334	79
Welland			469,774	342,808	37
Peterboro	10,010	4,115	466,905	345,372	35
Guelph			388,499	513,690	24*
Stratford	7,000	125	367,233	103,523	255
Preston			337,160	244,375	38
[illegible]			310,000	189,000	64
Nelson	3,400	6,650	273,865	166,700	64
	$10,977,955	$7,084,611	185,898,535	31,981,729	

Proportionate increase on totals for above cities, 41 per cent.

*Decrease

ary and in the latter the expenditure involved is so small as to be negligible.

It is significant evidence of Canada's progress and of the enterprising development of all branches of industry that in these yearly building returns, which include the estimate—naturally a conservative one—of all classes of building work, the first fifteen cities record gains ranging from 10 per cent. to 319. Even at Ottawa, where one is accustomed to looking for a decrease of some kind, and where losses have been recorded for some years, there is a gain of 21 per cent.

Winnipeg is to be congratulated upon attaining the twenty-million-dollar mark, but with Calgary in the same class she will now have to aim higher.

Concerning Toronto's outlay of twenty-seven and a half million dollars, it remains only to be said that during the last few years the city's development has been maintained so continuously that it would be fair to regard Toronto as the constructional barometer of Canada. This is evidenced by a consideration of the fact that in 1912 Toronto spent over twenty-seven million dollars, in 1911 over twenty-four million dollars, and in 1910 over twenty-one million dollars, with percentages of increase of 12, 15 and 16 respectively over the returns for the preceding year.

Taken as a whole, the returns indicate consistent but vigorous development with well-balanced activity in the larger centres. The figures are particularly eloquent as to the prospects for the present year.

Retrospective and Prospective

Toronto, Ont.—The city's building operations during 1912 represented a per capita expenditure of $60. The feature of the classified list is the large total for dwellings. During the year accommodation was made for the housing of 35,000 people in addition to the provision of 80 apartment houses. The classification is as follows:

Buildings	Number	Cost
Factories	86	$ 2,235,145
Warehouses	66	2,107,575
Dwellings	5,675	13,491,185
Apartments	80	2,205,500
Stores	383	1,301,325
Schools	14	1,120,000
Public halls	6	1,547,000
Churches	7	458,100
[illegible]	7	71,500
[illegible]	4	199,000
Picture theatres	10	91,000
Other buildings	[illegible]	629,220
Police stations	3	96,000
Public bath		34,000

Winnipeg, Man.—Over $20,000,000 was spent in building permits within the city of Winnipeg during 1912. Of this amount over seventy apartment houses were erected at a cost of about $3,000,000; $3,000,000 was expended for banks and office buildings, and over $2,000,000 was spent for factories and warehouses. The year 1912 is the first year in which the city's municipally-owned power plant was in operation. The result of the first year's work of the plant is entirely satisfactory. The cost of domestic lighting has been reduced 70 per cent., and that of power proportionately, and the plant is already paying its way, the monthly revenue covering the cost of interest, operating expenses, depreciation, advertising and other expenses, and that with less than 12,000 horse power in operation. The capacity of the plant is 60,000 horse power. Winnipeg prospers chiefly by reason of its commanding position as a railway centre for the West, and its progress has been closely identified with the development of railways. In forecast of the future it is of interest to note that this year will be a record breaker in the way of railway construction in the west. Under present arrangements the three larger railway companies, the C.P.R., the C.N.R. and G.T.P., will together build 2,700 miles of track, an increase of 125 miles over the construction work of 1912, or 1,975 miles built at a cost of $30,000,000.

Montreal.—Alcide Chausse, Superintendent of Buildings, estimates the total value of building operations at $26,116,955. The building permits for the city proper amount to $19,641,955, as shown in the table, but to this must be added, Mr. Chausse reports, a total exemption of $6,475,000, made up as follows: Buildings in Côte des Neiges ward, $50,000; in Longue-Pointe ward, $200,000; municipal buildings, $1,500,000; Harbor Board structures, $2,225,000; building operations which do not affect the structural strength of buildings, $2,500,000.

Calgary, Alta.—According to J. J. Fish, of the Building Department, there is every indication that Calgary will establish a new record in 1913. Dozens of large building projects are only awaiting an early spring. The following table shows the number and classification of buildings for permits taken out in 1912.

No.		Total
109	Business buildings	[illegible]
52	Warehouses and factories	3,271,200
243	Residences over $4,000	1,899,200
2173	Residences, $1,000-$4,000	4,744,900
44	Apartments, hotels	1,243,200
12	Schools	885,100
	C. P. R. shops	2,247,787
12	Churches	253,200
4	Fire halls	107,520
3	Government buildings	276,000
4	Theatre buildings	384,000
9	Livery stables	104,360
4	Garages	[illegible]
1	Hospital	[illegible]
[illegible]	Small buildings alterations and extensions	452,620
	Miscellaneous	[illegible]
[illegible]		$20,394,220

Vancouver, B.C.—All records have been broken in 1912 with building permits exceeding $19,000,000, which represented 3186 individual permits. Corresponding returns for 1911 were $17,652,642 and 2755 permits. Present indications point to an even more successful year for 1913, many important developments being already under way.

Victoria, B.C.—The building permits for 1912 show an increase of over one hundred per cent. on the figures for 1911. Several important building enterprises are already contemplated for this year and a prosperous time is expected for all interested in the building trade.

Edmonton, Alta.—Edmund T. Baines, Superintendent of the Municipal Information Bureau, reports prospects bright with a probable total of $200,000 for 1913—a prediction also made by Mr. W. A. MacIver, Building Inspector.

Saskatoon, Sask.—J. J. Harrison, Building Inspector, is optimistic concerning 1913. He reports the completion of plans for several reinforced concrete blocks and two hotels. During the present year he is confident that the total will mount up to $11,000,000.

Hamilton, Ont.—Jno. Anderson, Building Inspector, holds that 1913 will be a record year in the building trade at [illegible] [illegible]. The [illegible] that have located in Hamilton [illegible] have created a demand for a large number of dwellings and in this field there will be particular activity. [illegible] [illegible] troubles are anticipated.

Medicine Hat, Alta.—Trade conditions here are exceptionally good. In a report to this journal by Jas. E. Daley, of the Building Department, it is stated that over four million dollars' worth of industries have already made arrangements for the start of operations in the spring.

New Westminster, B.C.—Wm. Turnbull, Building Inspector, looks for a record during 1913 with particular activity in the erection of business structures.

Lethbridge, Alta.—Much new work is in prospect at Lethbridge according to H. W. Meech, Building Inspector. The [illegible] [illegible] two new hotels, a high school and a public library. A post office costing $250,000 is the largest building work under way. Last year 370 permits were issued, the classification being as follows: business blocks, 66; warehouses, 17; dwelling houses, 163; miscellaneous, 124.

St. Boniface, Man.—Henri Cusson, Building Inspector, informs us that trade conditions are very good and that all business houses have made large increases over previous years. A by-law was recently approved for the erection of a $400,000 bridge between Winnipeg and St. Boniface. There are now in course of erection (by J. H. Tremblay, Limited) the buildings of the Public Markets, Limited. These will constitute one of the largest stock yards on the continent and will involve an expenditure of some $250,000. The Stanley Mineral Springs Company are putting up a plant at a cost of $125,000.

Nelson, B.C.—G. C. Mackay, City Engineer, regards trade conditions and the outlook as most satisfactory. The present year promises to be one of great activity owing to the impetus that mining has received in this district. Road and building work will be heavy this year.

Grand Trunk Pacific Construction in 1912

The annual report of the Chief Engineer of the Grand Trunk Pacific Railway shows that during 1912 construction was undertaken on 563 miles of main line, and on 688 miles of branch lines, making a total of 1,251 miles of line on which clearing, grading and track-laying was done. Track was laid on 128 miles of main line, and on 331 miles of branch lines, making a total of 459 miles of railway completed exclusive of second tracks and sidings.

On the section known as "main line Winnipeg west," grade is now completed to mile 1,124, Rau Shuswap crossing, and track should be laid to that point before the close of the year. The line is in operation from Winnipeg to Tete Jaune Cache, mile 1,095. From the Rau Shuswap crossing at mile 1,124 westerly to mile 1,403 (Endako river crossing), the right of way is being cleared and at those points where clearing has been completed, active grading operations are under way. For instance, the grade from Rau Shuswap crossing to the second crossing of the Fraser river at mile 1,190, should permit of track laying in the space of a month or two.

From Prince Rupert easterly the track is laid to mile 189, being held up at that point, owing to the erection of steel bridges. Eighty-nine miles of this track were laid during 1912, and the line is in operation to Hazelton. From mile 189 to the Endako river crossing (mile 341 Prince Rupert, or mile 1,403 Winnipeg), active grading operations are in progress.

Harte to Brandon—Grading is under way on this branch and although 10.8 miles are ready for track no steel has yet been laid. The total length of this branch is 25 miles. Regina to international boundary, only the last 19 miles of this line require to be graded. The track is laid for 106 miles, and was all put down this season.

Prince Albert Branch—This line extends from Young on the main line, and is in operation from that point to Wakaw, a distance of 67 miles. No track was laid in 1912. A large steel bridge has yet to be erected over the South Saskatchewan river, but with the exception of the entrance into Prince Albert the grade is practically completed.

Tofield to Calgary—This line is 202 miles long. A few steel bridges have yet to be erected but grading is almost completed. During 1912 steel was laid from mile 07 to mile 165.3, and the track will be continued to Calgary in the early spring of 1913. The line is in operation to mile 62.

Other branch lines reported upon are the Talmage-Weyburn line, 15 miles in length, of which 39 per cent. of the grade is completed; and the Regina-Moose Jaw connection, of 49 miles, which is now completed, and its terminals at Moose Jaw in course of construction. Grading is completed on Moose Jaw-Northwest branch, but no steel has been laid. All the track on the Oban-Battleford branch was laid during 1912, and the line, 48.5 miles in length, is now completed. The Cut Knife branch from Battleford westerly toward Wainwright is finished, so far as grading is concerned, and four miles of track are laid. Steel will be laid throughout its length in the early spring of 1913. A branch line is surveyed from Biggar to Calgary, and it is stated by the chief engineer that for the present time this line is only being constructed as far as the Saskatchewan-Alberta boundary, a distance of 104 miles from Biggar. Grading on this portion was completed in 1912, and steel is laid to mile 37. The Alberta coal branch, which extends 56 miles southerly from Bickerdike on the main line, is graded for the whole of its present length.

Sub-contracts of the line of the Grand Trunk Pacific Railway for the last section between Fort George and Fraser Lake, a distance of 140 miles, have just been awarded and the uncompleted portion of the road will soon be occupied by graders and grading outfits, as the original plan of postponing work on this last link until next spring has been abandoned. The sub-contractors are now building construction camps and moving in their outfits from both ends of the completed grade.

The big steel bridges spanning Portphyry and Boulder Creeks have just been completed. These are the two largest steel bridges on the western division of the Grand Trunk Pacific, with the exception of the Skeena Crossing structure.

Recent announcement has been made of the dissolution of the well-known firm of architects, Messrs. Ross & MacFarlane, Montreal. Mr. David H. MacFarlane will continue his practice in the same city, and Mr. George A. Ross, with Mr. Robert H. Macdonald, has formed a partnership under the firm name of Ross & Macdonald. Mr. Ross needs no introduction in the building world, and Mr. Macdonald, through his association with Mr. Ross and Mr. MacFarlane for almost five years, is also very well known to the local interests and business connections. A considerable amount of the very important work of the firm now dissolved will be carried to completion by Messrs. Ross & Macdonald, and it is expected that announcement will soon be made of new work of considerable magnitude to be erected during the next building season.

Canadian Railroad Development

The new Canadian Pacific Railway bridge at Lachine, P.Q., was opened for traffic recently.

The Grand Trunk Pacific Railway have filed plans for and will shortly build a $1,000,000 hotel at Regina.

Over two thousand three hundred miles of new main line tracks were laid by the Canadian railways in 1912.

It is reported that the Canadian Northern Railway Company are contemplating the erection of a large hotel at Hamilton, Ont.

The Department of Railways and Canals has under consideration a change in the Welland Canal plans by which, in place of enlarging the old canal, the Welland River would be dammed for two miles near Welland.

The second unit of the Grand Trunk Pacific Railway Company's shops and foundries was recently completed at Transcona at a cost of $5,500,000. When running at full pressure, five thousand men will be employed.

It is understood that an interim report of the commission composed of Mr. G. Lynch-Staunton, K.C., and Mr. F. P. Gutelius, to enquire into the construction of the Transcontinental Railway during the late regime will be ready at the beginning of next month.

The Canadian Northern railway company has started work on its Toronto-Hamilton branch. Clarkson's is the scene of its acticity, and a big gang is working there grading and laying ties and rails. It is expected that the rails will be laid in both directions at once.

A ten-storey apartment house to contain three thousand rooms and to cost two million dollars, will be built in Toronto. Building will be started within a year by local capital on a site already purchased near Spadina and College streets.

Work is progressing steadily on a second unit to the Grand Trunk Pacific grain elevator on the Mission Terminal at West Fort William. The present capacity of the elevator is 3,250,000 bushels, which would alone suffice to place it among the largest structures of its kind upon the continent; but with the latest addition of 2,500,000, the total capacity will be 5,750,000, or, appreciably in excess of the world's other gigantic grain bins. A final capacity of no less than 20,000,000 bushels is contemplated.

Good progress is being made with the building of the four great bridges which are being built between Montreal and Pembroke by the Canadian Northern Railway. They are being built over the rivers Laprairie or Back River, the Mille Iles, and the Ottawa at Shaw Falls, and at Portage du Fort. All the sub-structures of these bridges are of concrete, which can be put in during the winter, while the super-structure will be of steel from the Dominion Bridge Company at Lachine, and will be placed in position during the coming summer. The cost of these four bridges will be about $1,750,000.

It was officially announced in the Canadian Pacific Railway recently that the Dominion Atlantic Railway, which is controlled by the Canadian Pacific Railway, will be practically reconstructed. At Yarmouth, the terminus of the Dominion Atlantic Railway, extensive operations are to be commenced immediately, consisting of a new [illegible] modern wharf, with an up-to-date warehouse. Along the line ten wooden bridges will be replaced by modern, steel structures. Though this extensive work is being carried on, no announcement is forthcoming as to when the company will start operating the D. A. R. in the name of the Canadian Pacific Railway.

Cement Trade Developments

For the purpose of conveying American coal to the plants and taking return cargoes of cement to points on the Upper Lakes, the Canada Cement Company have formed a new company, the Canada Cement Transport, Limited, of which Mr. Levy McMillan is marine superintendent. Two boats, each of 1,300 tons capacity, have been purchased, and these are being refitted so as to be ready for opening of navigation.

The Cement Company are making preparations to deal with the demand for cement west of the Lakes. The plant being constructed at Winnipeg, which will be completed during the summer, will have a capacity of 1,200,000 barrels per annum. A rock crushing plant has been established at Steep Rock, 150 miles north of Winnipeg, and the necessary amount of clay will be secured from the mill side in the city. The Calgary plant is now producing at the rate of half a million barrels per annum, while at the Exshaw mill, which is now capable of 500,000 barrels per annum, renewals are being completed, which will bring the output up to a million barrels. This means that by early fall, the company will be producing west of the Lakes 2,700,000 barrels yearly.

Mr. Doble, the secretary-treasurer, states that this total is larger than the whole consumption last year in the prairie provinces. The company, however, have still further extensions in the west under consideration.

Four Million Bushel Elevator at Port McNicoll

Some time ago we described and illustrated a 2,000,000 bushel elevator which was completed in 1910 by the John S. Metcalf Company, Limited, Montreal and Chicago, for the Canadian Pacific Railway at their new Georgian Bay terminal, Port McNicoll, Ontario. The business proved too large for the elevator by the time the latter had been in operation one year only; the same engineers were accordingly instructed to build an additional storage unit of the same capacity as the original elevator, making the total capacity 4,000,000 bushels.

The new storage unit, which was completed in time to be entirely filled with the 1911 crop before the close of lake navigation, is a duplicate of the first. It is 179 feet wide, and 226 feet long, making the new length of the elevator 452 feet. Each unit contains 32 cylindrical bins 32 ft. 11 in. in diameter, and 31 interspace bins; the bin walls are 80 ft. high.

The entire structure is of steel and concrete. The two marine towers, which travel alongside the original elevator, fill the new storage in the same manner as they filled the first unit. The longitudinal conveyors receiving from the marine towers run the entire length of the two units. Grain for shipment from the new portion is conveyed through the basement of the first storage to the car-shipping house. All machinery is electrically driven, power being generated in a steam plant built in connection with the original elevator.

The work of the John S. Metcalf Company for the Canadian Pacific Railway at this point includes: two travelling marine towers, capacity 20,000 bushels an hour each; 4,000,000 bushels fireproof storage; car-shipping house, 200 cars in 10 hours; 1500 h.p. power plant; about 1 1/3 miles of wharves; flour shed, 700 ft. long; freight shed, 700 ft. long; customs house; carpenter shop; coal platform; sleeping house for freight porters; eating house for freight porters; pump house; and water system for fire protection and general supply

For the railroad the work has been under the direction of Mr. J. M. R. Fairbairn, Assistant Chief Engineer, and Mr. C. W. P. Ramsey, Engineer of Construction.

The Engineering Society of Regina

The History, Work and Aims of a Progressive Professional Body in Western Canada—The Organizers and Officers

THE idea of organizing the engineering profession at Regina was first mooted some three years ago, when Mr. A. J. McPherson, now Chairman of the Board of Highway Commissioners of Saskatchewan, collected information concerning what had been accomplished in other cities with a view to submitting a scheme for consideration at Regina. Overtaken by a stress of work, however, Mr. McPherson was obliged to lay aside the work of organization and nothing further was done until rather more than a year ago, when the matter appealed strongly to Mr. R. O. Wynne-Roberts, who at once interested himself and others in the project. It was as first thought that a local branch of the Canadian Society of Civil Engineers would fulfil the requirements, but it was found upon examination that the local members were so very limited in number that there would be little chance of a successful organization. Mr. Wynne-Roberts discussed the matter with Messrs. McPherson, L. A. Thornton, H. S. Carpenter and a few others, and it was finally decided to convene a general meeting. This meeting was held on March 19, 1912, and the enthusiasm shown by the fifty who attended it was sufficient evidence of the opening that afforded. The matter was referred to a committee under the chairmanship of Mr. A. J. McPherson. The members of this committee were Mr. L. A. Thornton, then city engineer, who was appointed to represent the municipal engineers; Mr. O. W. Smith, representing the contracting engineers; Mr. H. S. Carpenter—the Government engineers; Mr. W. Bull—the electrical engineers; Mr. W. R. Riley—land surveyors; Mr. R. N. Blackburn—the mechanical engineers; Mr. R. O. Wynne-Roberts, —the consulting engineers; Mr. E. I. Wenger—the heating and ventilating engineers; and Mr. W. T. Daniel—the railway engineers. Mr. J. A. Gibson was appointed honorary secretary of this committee. These, with slight modifications, were adopted. The organization of the society now being practically completed, the following officers were elected: president, Mr. A. J. McPherson, Chairman of the Provincial Highway Commissioners; 1st vice-president, Mr. H. S. Carpenter, Deputy Minister of Public Works; 2nd vice-president, Mr. L. A. Thornton, City Engineer, now City Works Commissioner; corresponding secretary, Mr. R. O. Wynne-Roberts, M. Inst. C. E.; secretary, Mr. J. A. Gibson; treasurer, Mr. R. N. Blackburn, Wh. Sc.; librarian, Mr. E. I. Wenger. The formal inauguration of the society was completed at a banquet held in the King's Hotel on Thursday, May 2, 1912.

The first honorary member elected was Mr. C. Carrolls. The Society took this means of showing its appreciation of Mr. Carroll's long and distinguished service in connection with western engineering work.

Although the Society is purely local in its work at present, there are indications that it will soon develop into a provincial body, with branches in various centres. The Society is comprised of members, associate members and associates. The number of applications received at the first meeting of the executive was fifty-five.

The Society has already more than justified its existence and on every side there is abundant evidence of an extended sphere of application and usefulness. From a small beginning it is hoped that the Society will develop into an established institution with permanent quarters for the entertainment of its members. The executive has been loyally and enthusiastically supported, and with a broad progressive policy, and buoyed up by that spirit of achievement that is so characteristic of the West, it is an easy prediction that Regina before many years will have an engineering club in keeping with its reputation as an important constructional centre.

Mr. A. J. McPherson, President

Mr. A. J. McPherson, president of the Regina Engineering Society, is, as we have stated above, chairman of the Board of Highway Commissioners of the Province of Sas-

Mr. A. J. McPherson
President

Mr. L. A. Thornton
2nd Vice-President

Mr. R. O. Wynne-Roberts
Corresponding Secretary

OFFICERS OF THE REGINA ENGINEERING SOCIETY katchewan. He received his early education at the public schools in Ontario and at the Galt Collegiate Institute. In 1904 he graduated from the University of Toronto with the degree of B.A.Sc. From 1894 to 1899 he was town engineer and waterworks superintendent at Guelph. In 1899 and 1900 he was in partnership with Mr. Willis Chipman, Toronto, having charge of a branch office at Brockville. From 1901 to 1904 he was employed as a Dominion land surveyor on the local survey staff of the Department of the Interior, also with the territorial engineer at Dawson, Yukon. For some time he occupied the position of construction engineer on the Klondike Mines Railway. In 1905 he was appointed assistant chief engineer and superintendent of highways in the Public Works Department of the province of Saskatchewan. Two years ago he became city commissioner at Regina and early in 1912 succeeded to his present important position.

Mr. H. S. Carpenter, First Vice-President

The Regina Engineering Society has for its first vice-president an old Collingwood boy, who has become Deputy Minister of Public Works for the province of Saskatchewan. Born in the Ontario town in 1874, Mr. Carpenter passed through the public school and collegiate institute to the University of Toronto, from which, in 1898, he graduated with the degree of B.A.Sc. He was the '98 president of the Engineering Society of the S. P. S. In 1899 he qualified as an Ontario Land Surveyor and in the following year as a Dominion Land Surveyor. He accepted an appointment as engineer in the Department of Railways and Canals of the Dominion Government and was assigned to the Yukon Railway Exploration and the Trent Canal construction. He was elected an Associate Member of the Canadian Society of Civil Engineers in 1902. In 1905, upon the termination of his connection with the Dominion Government, he became District Engineer and Surveyor for Saskatchewan. Two years later he was appointed Director of Surveys and in 1910 Superintendent of Highways for the province. In the latter year he qualified as a Saskatchewan Land Surveyor.

Mr. L. A. Thornton, Second Vice-President

The 2nd vice-president of the Society, now Works Commissioner and formerly City Engineer of Regina, was born at Kingston, Ont., in 1880 and was educated at the public and high schools of that city and afterwards at Queen's University and the School of Mining, Kingston, from which in 1906 he received the degree of Bachelor of Arts and Bachelor of Science (in Civil Engineering). From 1901 to 1905 he was a member of the Trent Canal engineering staff, supervising the construction of the hydraulic lift lock at Peterborough and various other works. From 1906 to 1909 he was employed by the Saskatchewan Public Works Department in bridge construction at Saskatoon and Battleford. He was appointed City Engineer of Regina early in 1910 and succeeded to his present office two years later.

Mr. R. O. Wynne-Roberts, Corresponding Secretary

[illegible] in the public schools of Great Britain, Mr. Wynne-Roberts received his early training as a civil engineer under the late Mr. T. T. Marks and as a gas engineer under the late Owen Roberts. He was appointed assistant town engineer of Llandudno when only [illegible] years of age, and held that appointment for more than seven years. Later, for a number of years, he was Borough Water and Gas Engineer of [illegible]. After holding a similar post at Oswestry for four years, he went to [illegible] engineer in connection with a large waterworks scheme which involved the expenditure of $8,500,000. Returning to England, he established himself in consulting engineering practice at Westminster and was called in by a number of [illegible] on water and sewerage works. On two occasions the British Government made him sole arbitrator in connection with disputes over street railway and paving works. Coming to Canada in July, 1910, he was employed by the Regina City Commissioners to report on the water supply and submitted schemes, since adopted, involving an outlay of $2,000,000. Since then he has made a number of other important reports on water supply. It is of interest to note that he has just reported to the Saskatchewan Government on large power schemes from the lignite coal fields. Mr. Wynne-Roberts is the author of several books and is well known as a contributor to the technical press. He is an arbitrator to the London Court of Arbitrators, a member of the London Chamber of Commerce, a member of the Institution of Civil Engineers, and a Fellow and Examiner of the Royal Sanitary Institute. He was one of the founders of the Cape Society of Civil Engineers.

Mr. J. A. Gibson, Secretary

Mr. Gibson enjoys the unique distinction of having been born in Germany, educated in Scotland and adopted by Canada. His native place is Stuttgart, where he spent the first two years of his life. He was educated at Renfrew, Scotland, and served an apprenticeship of six years in the workshops and drawing offices of Messrs. Babcock & Wilcox, Limited, making a special study of power house economy. For two years he was engaged on the design of electric cranes. He is an Associate Member of the Institute of Engineers and Shipbuilders, of Glasgow, Scotland. He came to Canada in June, 1911, and is at present identified with the building field.

Mr. J. A. Gibson, Secretary Regina Engineering Society

Mr. R. N. Blackburn, Wh. Sc., Treasurer

The Old Country representation in the Regina Engineering Society is augmented by Mr. Blackburn, who hails from Liverpool. He was educated at the Liverpool School of Science, and had a most successful scholastic career. In 1886 he obtained Lord Derby's prize in the Government Science Examinations at South Kensington. In the same year he was awarded the Thommason Exhibition for the best student in mathematics and science in the counties of Lancashire and Cheshire. In the following year in a competition open to the United Kingdom he was placed third, winning Sir Joseph Whitworth's scholarship. He served a five-year apprenticeship in the workshops of Messrs. George Forester & Company, Limited, and one year in a drawing office. In 1889 he was engaged as draughtsman by Messrs. Thornewill & Warham, Limited, engineers, of Burton-on-

[illegible]. Two years later he became chief draughtsman for this firm and retained the position until [illegible] when he started in business for himself at Liverpool as a consulting engineer. His health failing, he came to Canada in 1903 and homesteaded. Later he entered the service of the Provincial Government of Saskatchewan and at the present time holds the position of Provincial Chief Inspector of Steam Boilers.

Mr. E. I. Wenger, Librarian

The Librarian of the Society is a McGill University man. He graduated in mechanical engineering in 1899 and in electrical engineering with the degree of B.Sc. in 1901. His first experience was obtained in the shops of the Canadian General Electric Company, Peterborough. This was augmented by his connection with the Westinghouse Electric & Manufacturing Company, of Pittsburg, Pa., with whom he remained from 1901 to 1905. In the latter year he became an associate professor in railway engineering, in charge of electric railway work, at the University of Illinois. This appointment was followed by his election as assistant professor of electrical engineering at McGill University. Here he remained until 1910, when he went to Regina for Messrs. E. & W. S. Maxwell, architects, to become supervising engineer of the Parliament Buildings—a detailed description of which was given in our last issue. In 1911 he established himself as consulting engineer at Regina. He is an Associate Member of the Canadian Society of Civil Engineers and the American Institute of Electrical Engineers and a member of the Western Railway Club.

Prevention of Concrete Accidents

In the orders taken by the Ministry of Public Works of two European countries—Germany and Austria—there is found a valuable suggestion as regards the above subject. This consists in the introduction of a system of official reports of all accidents. The reports are made out by qualified experts after systematic investigation.

The ordinances, as described by Dr. F. von Emperger in a paper presented to the recent congress of the International Association for Testing Materials, not only prescribed the procedure to be adopted in all kinds of building accidents (therefore including such accidents as, not being attended with any injury to life or limb, were not previously subjected to any jurisdiction), but also insured competent judgment, by providing a list of experts; whereas the preexisting reports on building accidents were not only very imperfect, but had also been drawn up, as a rule, by persons more or less unqualified for the work.

One of the chief causes of such accidents has always resided in imperfect knowledge of the material at the time of removing the falsework of the concrete, since, in view of the divergent influences to which the material is exposed in building operations, the quality of the material can only be imperfectly judged in the laboratory; or also because, in the absence of any connection between the laboratory and the building site, the material has actually escaped any checking. It has happened, for instance, that the falsework has been taken down from concrete which has been spoiled by frost or checked in its development, although the regulations laid down for ordinary average conditions have been strictly complied with; and that this premature dismantling of the falsework has led to extensive accidents. Moreover, it has also happened that some contractors have had accidents when working on approved lines, through using materials regardless of whether the same were equal to those with which they were acquainted.

Even the most careful precaution cannot, perhaps, always prevent accident; but builders do not always possess the warning consciousness of danger at the time when the latter is most imminent. For such contingencies, the present writer has found a trustworthy and proved auxiliary in the form of check or test beams, which enable one to ascertain, in a simple and reliable manner and on the spot, whether the concrete of a structure is quite ready for the falsework to be taken down or whether that operation should be delayed. The use of this auxiliary is strongly recommended when building operations are being carried on under unusual conditions, especially in autumn and winter; also in excessively hot weather, and when unknown material is being used; and a warning must be uttered against the assumption, so frequently expressed, that an experienced concrete layer can judge the quality of concrete by touch.

The writer has by this method been able to obtain results quite different from the opinion of experienced men when these opinions were based on an external examination alone, and the results thus obtained have upon further investigation proven the correct ones.

Westmount Engineers' Report

In his report to the road committee for the year ending Oct. 31, 1912, Mr. Archibald Currie, engineer of the Westmount city council, states that during the years 1911 and 1912 there were constructed 14.599 miles of road; 6.056 miles of sewers; 10.040 miles of concrete walls; 8.097 miles of curb and channels, and 0.017 miles of block crossings. On the question of estimates and expenditure, it is pointed out that work estimated to cost $386,082, actually cost $383,877, showing a net credit balance of $2,205. Mr. Currie states it was "not within the province of the report to dwell upon the merits or demerits of contract work as compared with departmental work. Both have claims upon consideration, but one thing to be deprecated is calling for tenders for work merely for the sake of comparing prices with an engineer's estimate." In 1910 the cost of the engineers' department was $14,444, while in 1911 and 1912 it worked out $14,268 per annum. During 1912 the building permits totalled $1,824,369, the average cost per building being $8,330, which compared with $1,435,682 and $7,760 in the previous year.

Legal Decision Affecting Municipal Work

Something more than general damage must be shown by a ratepayer who seeks an injunction to hold up public works; it must be shown that, in the event of a refusal, the suffering or prejudice which he would have to undergo would be such as to counterbalance the inconvenience to the municipality as a whole accruing from the granting of the writ. This is the law as laid down by Mr. Justice Guerin, Montreal, in the case of Oliver Jasmin, who sought to have the municipality of Cartierville, P.Q., restrained from paying $7,500 to Messrs. Demers and Laframboise, contractors, who are doing permanent sidewalk laying for the town. The petitioner objected that the money, $18,498, allocated to the work is insufficient, and that the money is being taken from a fund appropriated to cover sewer laying. Mr. Justice Guerin dismissed the application, with the remark that the petitioner had not shown in what way he was being injured as a ratepayer, and that the municipality would suffer great inconvenience by the issue of such an injunction.

Tenders will shortly be called for the dredging of False Creek, B.C. This improvement consists of dredging a channel 300 feet wide and twenty-two feet deep at low water. The work will probably take two years to complete and will require an expenditure of between $600,000 and $700,000. There will be several million cubic yards of silt, gravel and boulders and rock moved in the course of making this channel.

Personal Mention

Mr. D. W. F. Nichols and Mr. J. Pender West, architects, have entered into partnership under the name of Nichols & Pender West. The address of the firm is 911-917 Somerset Building, Winnipeg.

Mr. W. R. Brock has been made honorary president of the Canadian General Electric and chairman of the board. As president he is succeeded by Mr. Frederic Nicholls. Mr. W. D. Mathews has been elected vice-president in place of the late Mr. H. P. Dwight.

Mr. S. Bruce McConnell, M. Can. Soc. C. E., has been appointed assistant engineer to the C. P. R., with headquarters at Montreal. He has had several years' experience in railway construction in Canada, particularly in Ontario and Quebec, and has also been resident engineer on construction in Cuba. From January, 1910, to 1912, Mr. McConnell was assistant divisional engineer, eastern division, of the C. P. R.

Announcement is made of the resignation of Mr. Frank A. Creighton, City Engineer of Prince Albert, Sask., and City Commissioner. Mr. Creighton is a native of Dartmouth, N.S., and has had extended experience in municipal and railway work. He was appointed City Engineer of Prince Albert in 1907 and City Commissioner in 1911. His chief work for the western city has been the consummation of the civic power development scheme at Lacolle Falls. It is understood that Mr. Creighton will establish in private practice in Winnipeg.

Mr. F. A. Creighton, retiring City Engineer of Prince Albert

Automatic Sprinklers in Fire Prevention

While Canada and the United States have some of the best organized fire brigades in the world, the percentage of fire waste is far greater than in Europe. We are not paying enough attention to the prevention of fire, although within recent years capitalists and contractors have been more alive to the necessity of installing apparatus which will prevent fires from getting a good start. Automatic sprinklers are the best known means of doing this, the idea originating with Mr. Grinnell, who has given his name to an apparatus which is now used the world over. The Grinnell sprinkler is manufactured by the General Fire Extinguisher Company, the head office for Canada being at 175 McCord street, Montreal. Very few big buildings are now erected without a sprinkler system, for apart from the safeguard which it gives, there is the question of insurance to be considered. Fire officers make very substantial reductions on premiums, in cases where sprinklers are installed, experience having shown that the risks diminish in proportion to the number of sprinkled buildings.

The General Fire Extinguisher Company also fit steam power plants and instal steam heating systems of all kinds.

Provisional Arrangements for the Seventh Annual Convention of the Canadian National Association of Builders' Exchanges

Programme

Tuesday, February 18th, 1913

9:30 A.M. Registration of Delegates.
10:00 A.M. 7th Inaugural Meeting C.N.A.B.E.
Address of welcome by President of Calgary Builders' Exchange.
Reply by Mr. Nesbitt, Quebec.
Address of welcome by His Worship the Mayor of Calgary.
Reply and Presidential Address by Mr. Morley, Winnipeg.
Naming of Committees by President.
Adjournement for Luncheon.
1:30 P.M. Automobile Tours to points in Calgary.
8:00 P.M. Committee Meetings.

Wednesday, February 19th, 1913

9:30 A.M. Roll call of officers and accredited delegates.
Minutes of the 6th Annual Convention held in Toronto, February, 1912.
Reports of President and Secretary.
Adjournment for luncheon.
2:00 P.M. Reports of the provincial vice-presidents to be followed by discussion.
3:30 P.M. Paper to be read, followed by full discussion and any motions desired.
5:00 P.M. Paper to be read on organization.
Adjournment for dinner.
8:00 P.M.—Entertainment.

Thursday, February 20th, 1913

9:30 A.M. Paper.
11:00 A.M. Paper.
Adjournment for Luncheon.
2:00 P.M. Paper
3:00 P.M. Business Session for Delegates only.
Reports of Committees.
Prospective Legislation.
Election of Officers.
Ways and Means .
Adjournment.
8:00 P.M. Banquet for delegates and visitors.

Papers to be read are as follows:—

Technical Education, by Mr. Kidner, of Calgary; Relation of Architect and Contractor in Legislation, by one of three local men; Organization, probably Mr. Miller, of Edmonton; Town Planning.

Standard Underground Cable Co. Extending

The Standard Underground Cable Company, Limited has established new branch offices at Montreal, Quebec and Winnipeg, in order to facilitate the prompt handling of their growing business.

The Montreal office will dispose of all business from the province of Quebec and the eastern part of the province of Ontario. This office is in charge of Mr. R. G. Harris, formerly connected with the general offices of the Standard Underground Cable Co., Pittsburgh, Pa., but more recently with the New York sales office of that company.

The Winnipeg office will take care of all business coming from the provinces of Alberta, Saskatchewan, Man-

[illegible] a portion of the province of Ontario lying west of Ft. William. Mr. B. S. Stewart has charge of this office. Mr. Stewart has spent some time in the general offices of the associate American company, Pittsburgh, Pa., later going to the Chicago sales office of that company where he has spent a number of years.

The general offices of the company at Hamilton, Ont., will handle all business from the central and northern portions of the province of Ontario. Mr. W. H. Marsh, sales manager and secretary of the company, has direct charge of business coming into this office as well as general supervision of the various branch offices.

Business originating in the province of British Columbia and in Alaska and the Yukon territories will be handled by the Seattle, Wash., office of the company, and business from the Maritime Provinces will be handled by the Boston, Mass., office. This is a temporary arrangement in order to secure prompt service for customers in those districts until the volume of business justifies establishing separate offices in the Dominion.

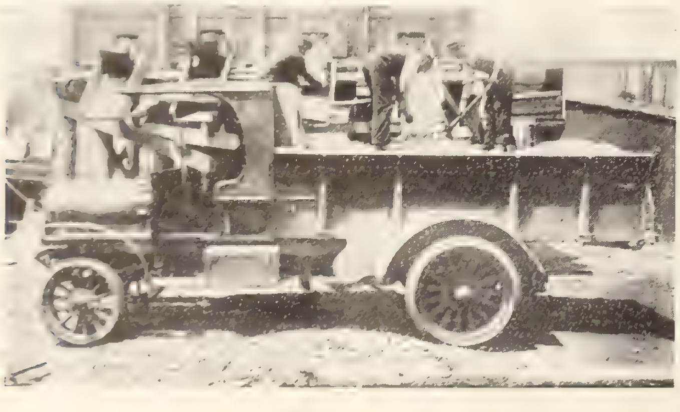
The establishment of these branch sales offices puts the Standard Underground Cable Co., of Canada, Ltd., in an excellent position to handle all business with accuracy and dispatch. The men in charge of the various offices are salesmen of experience and ability, released by the associate American company in order to strengthen the personnel of the Canadian company.

Economy of the Motor Truck

Contractors are becoming more alive to the economic possibilities of the motor truck, and the large increase in their use by those who require the transportation of medium and heavy loads is sufficient to indicate that trucks have great advantages over horse haulage both as to efficiency and low cost of operating. In these days of keen competition the contractor is bound to study the cheapest methods, and to see that he is using the best plan for the economical handling of his work.

One of the most recent introductions on the Canadian market is the Mack truck, the sole agency of which is in the hands of the Canadian Fairbanks-Morse Company, Limited. The company will establish service depots in the principal cities, where stock cars ranging from one to 7½ tons will be shown. The latter trucks will be fitted with special dump and tipping bodies, and are suitable for the conveyance of heavy material. Mr. W. H. Sickinger is at the head of the new department at Montreal, and it is the policy of the company to sell only in such instances where an investigation shows that the trucks can be profitably operated.

The Mack truck has been selected by the Canadian Fairbanks-Morse Company as being especially suitable for the heavy duty work which has to be done on the rough muddy roads off the main streets and outside city limits. It has a particularly effective transmission gear which is practically "fool proof" and can be operated even by a driver who has had no previous experience with a motor truck.



Mainly Constructional

The News in Brief—From Coast to Coast

The annual meeting of the Montreal Builders' Exchange will be held on January 20.

Tenders have recently been called for from Ottawa for a new post office for Fredericton, N.B.

A six-storey apartment house is to be erected on Georgia street, Vancouver, at a cost of $85,000.

It is expected that about $1,000,000 will be spent in the province of Manitoba for good roads in the next few months.

A large office building is to be built at Victoria for Mr. R. T. Elliott, K.C. The structure will be eight storeys high and will cost approximately $175,000.

The question of hiring an expert British engineer to report on the filtration plant is being discussed by the city council of Toronto.

Operations are expected to start in the spring on the new $500,000 post office for Saskatoon. The exact location of this building has not been definitely decided upon.

It is understood that the Canadian Pacific Railway Company intend to materially increase their present yard space at Regina in the near future.

It is reported that work will be started at once on the erection of a $20,000,000 steel mill at Sandwich, Ont., for the United States Steel Corporation.

Assessment Commissioner Forman's report to the City Council of Toronto, gives the total assessment for 1913 at $426,127,851, an increase of more than $80,000,000 over 1912.

It is expected that one hundred additional acres will be purchased for the university site at Point Grey, B.C. The present site contains one hundred and seventy-seven acres.

The Midland (Ont.) Drydock Company will start work at once on the construction of a $250,000 floating dock which will be capable of lifting the largest steamer on the Great Lakes.

It is proposed to build twenty-five cement houses at Lindsay, Ont., within the next few months. These will be built by the National Concrete Company, the first of them being for their employees.

The Harbor Commissioners of Montreal have leased to the Grand Trunk Railway 214,000 square feet of land, part of which will be used for erecting an addition to the company's elevator.

Tenders which were recently received for the new Technical School at Toronto, were very considerably higher than the estimates. The cost will be in excess of $1,000,000. Awarding of contracts was deferred.

Work will be commenced as soon as the weather permits on the erection of a new vaudeville theatre on Terauley street, Toronto. The cost of the site and the building were each in the neighborhood of $250,000.

The Mount McKay Brick & Tile Company, Limited, have started operations with a working capacity of 20,000 bricks a day. This amount will, however, be largely supplemenced in the spring when machinery will be installed which will increase the daily production to 100,000 a day.

The following towns and cities of Ontario recently voted in favor of obtaining electric power from the Hydro-Electric Power Commission: Owen Sound, Stayner, North Bay, Peterboro, Clinton, Goderich, Elmira, Winchester, Beaverton.

The annual convention of the Canadian National Association of Builders' Exchanges will be held at Calgary February 18-20. Mr. J. H. Lauer, the general secretary, Montreal, has made arrangements for cheap rates for Eastern delegates.

The Ontario Good Roads Association will hold its annual convention on February 26-7-8. Hon. Dr. Reaume will address the convention, and Mr. L. A. Page, director of the United States Office of Public Roads, will speak upon road maintenance.

In order to further the good roads movement in the Province of Ontario, the Good Roads Educational Association of Ontario has been formed. The new organization are of the opinion that the Provincial Government should be asked to assist in promoting good roads.

The course of lectures on reinforced concrete given by Prof. E. Brown at McGill University last winter were well attended and successful that it has been decided to give another course this year. The lectures, ten in number, will be accompanied by experiments in the laboratory.

The Montreal Light, Heat & Power Company have decided to construct a new gas plant at Cote St. Paul, for the purpose of adding twelve million feet to their capacity. The work is estimated to cost between $2,000,000 and $3,000,000, and will be commenced in the spring.

We have received from the Siemens Company of Canada, Limited, Montreal, a useful pocket diary for 1913. The diary is gilt edged and attractively bound in leather. It is accompanied by an insurance coupon and contains a great deal of valuable information, both of a trade and general nature.

The output of rolling stock from the Canadian Pacific Railway Angus shops during the last year in all departments, passenger equipment, freight equipment, maintenance of way, and locomotives reached the total of 17,357 vehicles, made up as follows: Passenger equipment, 248; freight equipment, 16,693; maintenance of way, 119; locomotives, 297.

A petition signed by three-quarters of the owners of land has been presented to the Premier of Quebec asking the Government to build a state road between the boundary line at Rouse's Point and St. Johns, from St. Johns to Chambly, and from Chambly to Longueuil. The petitioners guaranteed that the various municipalities would contribute towards the cost thereof the sum of $1,000 per mile.

According to Mr. W. A. McLean, Provincial Engineer of Highways in Ontario, the amount of road construction in 1912 was considerably below the normal, and Mr. McLean attributes this shortage as being due to the wet weather. The total expenditure on road construction was about $750,000, and of this amount $250,000 went into York county roads.

Tenders are being called for the dredging at False Creek, B.C. The work is for making a channel 350 feet in width from a point in English Bay, where [illegible] [illegible] of the Great Northern [illegible] [illegible] Main street. This channel is to be 20 feet deep. It is expected that more than three million yards of gravel and sand will have to be removed.

The Fourth Annual Meeting of the American Society of Engineering Contractors was held on January 14 in New York City. At the afternoon session Mr. W. L. Bowman, civil engineer and attorney-at-law, presented an interesting paper entitled, "Legal Hints to Contractors," while at the evening session Mr. E. F. Crocker, ex-chief of the New York Fire Department, gave a lantern slide talk on "Fire, Its Effects and Its Prevention."

Two additional skyscrapers are to be built in Montreal by Mr. James H. Maher. One of these, of ten storeys, will be on Victoria street, the lower portion being fitted up for four storeys and the upper floors for office purposes. It will be of concrete with Indiana limestone exterior. Saxe and Archibald, Montreal, are the architects. The other building will be on Craig and St. Urbain streets, and will be an office structure of several storeys.

A good roads convention will be held in St. John, N.B., on January 29th. Each county, parish and district in the province is urged to send delegates in order that a strong association may be organized to impress upon the Provincial Government the importance of a more progressive and good roads policy. It is hoped to have as one of the speakers, A. W. Campbell, Deputy Minister of Railways and Canals, who is now known throughout Ontario as "Good Roads" Campbell. The Good Roads Association of St. John is holding a series of meetings throughout the county this winter to interest the farmers in the whole subject.

Herbert Morris Limited, who have recently opened an office and factory in Toronto, have just booked an order for six two-ton electrically operated overhead travelling cranes for the Whitehead Torpedo Company, of Toulon, France. They have also secured an order for two 5-ton electric cranes from the South Durham Steel and Iron Company, of West Hartlepool. This order, following the installation of six 10-ton cranes in the early part of 1912, it is evident that satisfactory operation had some effect in the placing of the second order. The New South Wales Government quite recently placed an order with Herbert Morris Limited, for two 5-ton electric overhead travelling cranes for the Tramway Department.

Active operations have commenced in Prince Rupert on the construction of the gigantic dry dock, which, when completed, will be the largest on the Pacific Coast, and of its type one of the largest on the American continent. With a lifting capacity of 20,000 tons, a length of 604 feet 4 inches and a clear width of 100 feet, it will be able to accommodate the largest ships on this coast, or any that will come through the Panama Canal. Two years is the time allotted in the contract for the completion of this dock, which is estimated to cost when finished nearly three million dollars. The work is being carried on by the Grand Trunk Pacific Railway, the bonds for the money being guarantted by the government of Canada.

Hardening and Coloring Concrete

Editor Contract Record:

Will you kindly advise me as to a method of hardening cement brick. I am also desirous of finding a permanent coloring for red. So far as I know there is nothing that can be relied upon [illegible].

Yours truly,

J. C. Fletcher.

The best method of hardening cement brick would be to use a different quality of cement. The Master Builders Company (represented by Mr. A. D. Dame, Janes Building, Toronto) have a product which is claimed to harden the surface of concrete and make it practically waterproof. For a permanent coloring matter we would suggest about 10 per cent of the best raw iron oxide.—Ed.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Brantford, Ont.
Waterworks extension to cost $50,000. Sec. Board of Water Commrs., Fred W. Frank. City Engineer, T. H. Jones. By-law carried.

Brighton, Ont.
Gravity waterworks system to cost $5,000 planned by village council. Clerk, T. C. Lockwood. By-law passed.

Ft. William, Ont.
Improvements to highways to cost $10,500 planned by city council. Clerk, A. McNaughton. Ratepayers voted on by-law Jan. 6th.

Galt, Ont.
Extension to waterworks system planned by town council. Clerk, Jos. McCartney. Ratepayers voted on by-law Jan. 6th.

New Market, Ont.
Sewers planned. Clerk, J. E. Hughes. By-law carried Jan. 6th.

Niagara Falls, Ont.
Pavement. Queen Victoria Park Commission River Road contemplate laying 1½ miles brick pavement 30 ft. wide in the spring. Supt., J. H. Jackson.

Ridgetown, Ont.
Waterworks system to cost $5,500 planned by town council. Clerk, D. Cochrane. By-law passed.

St. Andrews, Man.
Grading and surfacing roads to cost $54,000 for Municipality of St. Andrews. Sec.-treas., J. McDougall, Lower Ft. Garry, Man. By-law passed.

Ste. Maritine, Que.
Macadam roadways planned by town council. Tenders received by Sec.-treas. Nap. Mallette until Jan. 20 from whom further particulars may be obtained.

Selkirk, Man.
Grading and surfacing East River roads to cost $36,000 for Municipality of St. Clements. Sec.-treas., T. Bunn, Selkirk. By-law passed.

Tilbury, Ont.
Extension to water main, Fort street, under consideration of the town council. Clerk, W. A. Hutton. Plans will be prepared.

Tillsonburg, Ont.
Improvements to water works system planned by town council. Sec., A. E. Raynes. By-law passed.

Virden, Man.
Roads to cost $160,000 planned by Municipality of Wallace. By-law will be submitted to raise the above amount.

CONTRACTS AWARDED

Winnipeg, Man.
Water mains. Engineer, H. N. Ruttan, 223 James ave. General contractor, J. W. Astley, Engineer of Construction, City Yards, for water mains in Digby, Sinclair, Ellice and Clifton. M. Peterson, Secretary Board of Control.

Railroads, Bridges and Wharves

Bourget Station, Ont.
C. P. Ry. Co. have been authorized to construct two spurs for the Bourget Brick Mfg. Co. Ltd.

Bowmanville, Ont.
C. L. O. & W. (C.P.Ry.) Co. have been authorized to construct bridge No. 1494 over mill pond at Bowmanville Twp. Darlington, Co. Durham, Ont.

Brantford, Ont.
Dykes, etc., to cost $15,000 under consideration of the council. Clerk, H. F. Leonard. By-law carried.

Counties of Laval & Jacques Cartier, Q.
C. N. O. Rly. Co. have been authorized to construct a bridge across Riviere des Prairies (main channel) between counties of Laval and Jacques Cartier, mileage 40, from Hawkesbury.

Ft. William, Ont.
Extension to street railway to cost $140,000 planned by municipal council. Clerk, A. McNaughton. By-law passed.

Grandview, Man.
C. N. Ry. Co. have been authorized to construct spur for the Burrow's Lumber Co.

Ladner, B.C.
Station. Great Northern Railway Co. will erect office and depot building. Plans in progress.

L'Islet, Que.
Wharf superstructure. Dominion Government, Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Tenders received by secretary until January 27th, Specification, etc., at offices of J. A. Tremblay, Dist. Engineer, Montmagny, Que.; A. R. Decary, Dist. Engr., Post Office Bldg., Quebec; Postmaster, L'Islet, Dept., Ottawa, and MacLean Daily Reports Limited, Toronto and Montreal.

Lockport, Man.
Fishway. Dominion Government, Department of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by secretary until January 27, 1912, for construction of fishway for St. Andrew's Dam, Red River, Lockport, Man. Plans, specifications, etc., at Department of Public Works, and at the offices of W. Z. Sarle, Dist. Engineer, Winnipeg, Man., and Postmaster, Lockport. Specifications also at office of MacLean Daily Reports, Toronto and Montreal.

London, Ont.
Electric railway to cost $1,000,000 planned by city council. City engineer, W. H. Brazier. By-law to be prepared asking citizens to expend above amount on electrifying the London & Port Stanley Railway.

Montreal, Que. Maisonneuve
Station for Can. Northern Rly., 230 St. James street, Montreal. Engineer, Marcus Dufresne, LaSalle avenue and Ontario street, Maisonneuve. Plans are being prepared.

Montreal, Que.
Car barns (alterations) to cost $7,440, Harbor street. Montreal Tramways Co., 78 Craig street, will remove part of wall and rebuild as shown in plans 58 A.F., 30 ft. back from street line, take out floors and put in tracks; cement foundation, felt and gravel roofing. Engineer, Jos. D. Evans, 78 Craig street.

New Westminster, B.C.
Harbor improvements for city council. Harbor engineer, A. O. Powell, 511-14 Westminster Trust Bldg. Tenders received until Jan. 20 for (1) 3-yard clam shell dredge and one or two stiff leg derricks fitted with clam shells for unloading sand from barges and machinery for unloading stone; (2) 1 tug; (3) 3 350 or 400 ton scows and 1 fuel barge; (4) wire rope; (5) pile driving and timber work for quay construction, contractor to furnish his own piles; (6) about 25,000 to 30,000 tons of rock delivered on barges at New Westminster. Work to be done by day labor.

Quebec, Que.
Dredging. Tenders received by Harbor Commissioners, Secretary, R. Renault, until January 31st, for dredging of 2,500,000 up to 5,000,000 yards, mostly sand, up to depth of 35 to 36 fe. Full information from engineer of Harbor Commissioners, Quebec.

Red Deer, Alta.
Railroad. The Alberta Central Rly. Company's revised location of railroad from point in Sec. 8-38-27-W-4 M mileage 0 to a point in Sec. 2-39-4-W-5 M mileage 40 west of Red Deer, Alta., has been approved.

Toronto, Ont.
C. N. O. Rly. Company's location of Don Station at Toronto has been approved.

Vancouver, B.C.
C. P. Rly. Co. have been authorized to construct bridge No. 75.6 over Crazy Creek, Cascade sub-division B. C. for double tracking.

Car barns to cost $175,000 (Kitsilano) for the B. C. Elec. Rly. Co., 16 Hastings street E. Gen. Mgr., R. H. Sperling. Architects, Somervel & Putman, 744 Hastings street west. Work will start as soon as general manager returns from London, Eng.

Winnipeg, Man.
Bridge. Petition is in circulation for a bridge over Assiniboine river at Donald street. Board of Control. Sec., M.

Peterson. Engineer, H. N. Ruttan, 223 James avenue.

CONTRACTS AWARDED

Midland, Ont.

Floating drydock to cost $250,000 planned for Midland Drydock Co. Company has been granted bonus by town and work will start at once.

Tecumseh, Ont.

Railroad construction to cost $250,000 (to Belle River) for Windsor & Tecumseh Rly. Co., head office, Windsor. 10 miles, single track, only grading to be done at present, 70 lb. rails required.

Public Building, Churches, Schools, etc.

Province of Alberta

Elevators planned for the Grain Growers' Grain Co. Ltd, Keewaden Bldg., Portage avenue E., Winnipeg, Man. The Alberta Govt. will guarantee company's bonds to the extent of $1,000,000 in return for which company will erect 60 new elevators throughout Alberta.

Berlin, Ont.

Fire station to cost $18,000 under contemplation. Clerk, A. H. Miller. By-law passed; plans will be prepared.

Brantford, Ont.

Theatre to cost $4,000 planned for Jas. O'Reilly, prop. American Hotel. Architects, Stewart & Witton, 2 Hughson St. S., Hamilton. To be completed in about 3 months.

Dormitory building (Institute for Blind) to cost $50,000. Prov. Govt., Department of Public Works. Sec., H. F. McNaughton, Parliament Bldgs., Toronto. General contractor, P. H. Secord & Son, Ltd., 137 Nelson street. Tenders received by secretary until noon, Jan. 17, for heating, plumbing and electric wiring. Plans and specifications at Dept., Toronto, and Institution.

Post Office to cost $250,000, Dalhousie and Queen streets. Dom. Govt., Dept of Public Works. Sec., R. C. Desrochers, Ottawa. Tenders received by owners until 4 p.m. Monday, Feb. 3, 1913. Plans, specifications, etc., at office of Thos. Hastings. Clerk of Works, Postal Station "F," Yonge street, Toronto, Post Office, Brantford, and Dept., Ottawa.

Chatham, Ont.

Remodelling theatre to cost $10,000 for W. O'Brien, Mgr. Walker Shirt & Pant Co., Market Bldg. Seating capacity 1,000. Plans will be prepared.

Edmonton, Alta.

Moving picture theatre for Starland Ltd., 626 Main street, Winnipeg. Architect, A. Melville, 405 Builders' Exchange, Winnipeg, is preparing plans.

Ft. William, Ont.

Incinerator plant to cost $15,000 under contemplation of the city council. Clerk, A. Mc [illegible]. Ratepayers voted on by-law Jan. 6th.

Fredericton, N.B.

Lavatory system for High school. Archt. F. Neil Brodie, 42 Princess street, St John. Board will shortly call for tenders. System to include 20 automatic flush closets and plumbing accessories.

Post Office. Tenders received by R. C. Desrochers, secretary, Dept. Public Works, Ottawa, until Jan. 28. Plans, etc., from D. H. Waterbury, Supt. of Buildings, P. O. Building St. John, P. O. at Fredericton and this Dept. Cheque for 10 per cent. must accompany each tender payable to Hon. Minister of Publec Works.

Fernie, B.C.

Drill Hall for Dom. Govt., Dept. of Militia & Defence. Sec., Col. Eug. Fiset, Ottawa. Plans, specifications, etc., from officer commanding Military District No. 11, Victoria, City Clerk at Fernie or Director of Engr. Service, Ottawa. Tenders received by secretary until noon, Jan. 25, 1913.

Grand Forks, B.C.

Post office fittings. Dominion Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Plans and specifications to be seen at offices of G. D. Clark, Clerk of Works, Public Bldg., Grand Forks, B.C., W. Henderson, Resident Architect, Victoria, B.C., and Department, Ottawa. Specifications also at MacLean Daily Reports Limited, Toronto and Montreal. Tenders received by secretary until January 20, 1913.

Hamilton, Ont.

Central fire station planned by City Council. Mayor, Controller Allan. Architects, Stewart & Witton, 2 Hughson street. Ratepayers carried by-law to raise $30,000 to complete new building.

London, Ont.

Sunday School, cost $20,000, for Centennial Methodist Church Congregation. Pastor, Rev. H. S. Graham, 850 Dundas Street. Superintendent, Wm. Jeffrey. Competitive plans called. Work to start in spring. Two storeys, brick construction, furnishings and seating required.

Addition to treatre contemplated for Wm. Bernard, Dundas and Wellington streets. Plans to be prepared shortly.

Moose Jaw, Sask.

Starland Limited, 626 Main street, Winnipeg, plan to erect moving picture theatres here and at Regina and Calgary. Architect, A. Melville, 405 Builders' Exchange, Winnipeg.

Melville, Sask.

College to cost $20,000 for Evangelical Lutheran Joint Synod. Trustees, Rev. Geo. Gehrke, 667 William avenue, Winnipeg. Architect, Edgar Prain, 313 Fort street, Winnipeg. Brick construction. Tenders called after Jan. 15, 1913.

Mimico, Ont.

Library planned by village council. Clerk, Andrew Dods. By-law passed Jan. 6.

Prince Albert, Sask.

Mechanics Institute, cost $60,000. O. B. & A. J. Manville and A. G. Creighton. Architects, Creighton & Crowther, Central ave. Four storeys, cement foundation, structural steel and brick construction. Tenders received by architects after February 1-13 till Feb. 28, 1913.

Peterboro, Ont.

[illegible] installation to cost [illegible] planned by city council. Clerk, S. R. Armstrong. Engineer, T. A. S. Hay. By-law passed.

St. Catharines, Ont.

Fire hall to cost $12,000 planned by city council. Mayor, Dr. W. Merritt. Engineer, W. D. Scott. Ratepayers voted on by-law Jan. 6th.

Saskatoon, Sask.

Moving picture theatre for Starland Ltd., 626 Main street, Winnipeg. Architect, A. Melville, 405 Builders' Exchange, Winnipeg, is preparing plans.

Toronto, Ont.

Vetinary College to cost $200,000 University and Anderson streets. Prov. Govt., Dept. of Public Works. Sec., H. F. McNaughton, Parliament Bldgs. Tenders received by secretary until noon, Jan. 17, for heating, plumbing and electric wiring and plastering. Plans and specifications at office of Dept.

Theatre to cost $750,000 contemplated for Michael Shea, Victoria and Richmond streets; seating capacity 3,000. Site has been secured on Teraulay street opposite the City Hall and plans are under way. Affiliated with Mr. Shea are: B. F. Keith, E. F. Albee, John Murdock, Martin Beck, B. F. Proctor and other interests representing more than 100 theatres in the United States.

Vancouver, B.C.

Wooden fog alarm building to be erected on a concrete pier at First Narrows, Vancouver Harbor. Tenders received by A. Johnston, Deputy Minister of Marine & Fisheries, until February 10. Plans, etc., at this Dept., Ottawa, and Victoria and New Westminster.

Victoria, B.C.

Theatre, Broughton and Blanchard streets, for the Victoria Opera House Co., Ltd., Pemberton Blk. Architects, Rochefort & Sankey, 217 Pemberton Blk. Excavation, Pacific Coast Construction Co., Yates street. Tenders received by architects until Friday, Jan. 16th, for construction of concrete foundation. Plans and specifications at office of architects.

Public building to cost $15,000 for Marine & Fisheries Dept. Dom. Govt., Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Plans in progress.

Provincial Jail (Wilkerson Rd.) Plans, specifications, etc., at office of tngineer J. E. Griffiths; reinforced concrete, pressed brick and terra cotta construction. Tenders received by Minister, Hon. Thos. Taylor, until Jan. 28.

Walkerton, Ont.

Library planned by town council. Clerk, J. H. Scott. Ratepayers carried by-law authorizing expenditure of $1,700 for site.

Winnipeg, Man.

College contemplated for Swedish Lutherans. Interested, Mr. Lidholm, c/o Thornstad, Roee & Lidholm. Plans will be prepared and work started as soon as site has been secured.

Windsor, Ont.

Armouries, cost $30,000, addition. Dominion Government. Dept. of Militia & Defence. Secretary, E. F. Jarvis, Ottawa. Architect, Chief Engineer Hodgins, Militia Dept. Lt.-Col. Wigle, Windsor, has charge of installing equipment. Work to start in spring. Two storeys and basement, brick construction, swimming pool, mess hall [illegible] bowling alley ,lockers, shooting range, billiard room, assembly hall. Plans in progress.

Woodstock, Ont.

Extension and improvements to Collegiate Institute to cost $30,000 planned by [illegible] ratepayers voted [illegible]

CONTRACTS AWARDED

Brampton, Ont.

[illegible] Carpenter [illegible] construction [illegible] required [illegible]

Regina, Sask.

[illegible] laundry plant $3,600; extra for internally fired boilers $950. Contract for stock to Weber Chimney Co. for reinforced [illegible]

St. Catharines, Ont.

[illegible] Ontario St. Owner and builder, F. Wilson. Electric lighting, steam heating; furnishings required.

Business Buildings and Industrial Plants

Blenheim, Ont.

Remodelling bank building planned for The Standard Bank of Canada, head office King and Jordan streets, Toronto. Office fittings, safe, wire cages, desks, etc., required. Full information from head office.

Canning factory to cost $40,000 planned for The British Canadian Canners, Ltd. Mgr., John Wall, 34 James St. N., Hamilton. Ratepayers voted on by-law Jan. 6th, granting concession to company.

Bridgeburg, Ont.

Planing mill, Erie street, planned for Oscar C. Teal, Dufferin street. 1-sty., cement foundation, concrete block construction; equipment required. Excavation started.

Cayuga, Ont.

Butter factory contemplated for Arnold Aldrich, H. N. Carr, both of Selkirk, Ont., and R. S. Colter, Cayuga. 1-sty., 32 x 24, cement block construction. Plans in progress.

Store to cost $7,000, Talbot street, for R. John Hinds. Brick construction. [illegible]

Chatham, Ont.

Auto machine shop (addition) to cost $10,000 for Chaplin Wheel Co., 240 Raleigh. (A. D. Chaplin, 449 King street) Machinery required. Plans will be prepared.

Harrow, Ont.

Canning factory planned for Canadian Canners, Ltd. Ratepayers voted on by-law granting bonus to company.

Hamilton, Ont.

Hotel to be erected for Canadian Northern Railway Company; Head Office, Toronto, Ont. President, Sir Wm. MacKenzie, Avenue Road Hill, Toronto. Company's architect is preparing plans.

Factory contemplated for Eversharp Pencil Company, St. Paul, Minn. Interested, H. L. Frost, c/o Frost Wire Fence Co., Sherman ave. north. Representative, H. C. Carson is in city looking for site. Plans in progress.

Store, James street north, for Stanley Mills Co., King street east. Architects, Mills & Hutton, Bank of Hamilton Bldg. Five storeys, 100 x 40, new water tower required. Plans in progress.

Factory to cost $4,200, Cumberland avenue, for Furnwall-New Ltd., Spectator Bldg. Architect, H. H. New, Spectator Bldg. 1-sty., 80 x 50, reinforced concrete construction, cement foundation. Plans in progress.

Harriston, Ont.

Furniture factory (extension) contemplated for Harriston Furniture Co., Webb street. Mgr., H. Leighton, John street. 2-sty., 60 x 80, cement, brick, stone, fireproof construction, factory machinery, freight elevators. Plans will be prepared.

Peterboro, Ont.

Factory, cost $60,000, for Henry Hope & Sons, Ltd., Canada, Birmingham, Eng. Plant to be in operation January 1st, 1914. One storey, 200 x 80, cement and brick foundation, reinforced concrete and brick construction, concrete and fireproof floors. By-law carried.

Petrolea, Ont.

Addition to automobile factory planned for The Petrolea Motor Car Co. Ratepayers voted on by-law to grant bonus of $10,000 to company.

Prince Rupert, B.C.

The Cold Storage Co. will erect a fertilizing plant in the spring and possibly a fish canning factory.

Saskatoon, Sask.

Warehouse, 2nd avenue, contemplated for The Great Western Furniture Co. 5-sty. Plans will be prepared.

Stratford, Ont.

Dairy, 116 Albert street, contemplated for The Stratford Creamery Co. Mgr., Michael Ballantyne. Office equipment, machinery for pasteurizing and bottling milk, refrigerating plant required. Plans will be prepared.

Sutherland, Sask.

Factory for The Justice Grain Measure Co. Architects, Bugenhagen & Turnbull, Saskatoon, have been instructed to prepare plans.

Sydney, N.S.

Fertilizer plant contemplated for Cross Fertilizer Co. Ltd. 1-sty., 350 x 100. Will install dissolving dens, overhead railway and conveyor, also disintegrating machine. Plant to have capacity of 10,000 tons mixed fertilizer per annum. Plans will be prepared.

Toronto, Ont.

Office building, 160-2 King street, for F. M. Holland, 12 King street west. Six storeys, brick, structural steel construction. Plans will be prepared.

Vancouver, B.C.

Can factory planned for the American Can Co., Chicago, Ill. Western manager, F. D. Kendal, Portland, Oregon. Company has leased 400 feet of property on Railroad street and intends to erect factory at once. To be finished by May 1, 1913.

Addition to warehouse for W. H. Malkin Co., 57 Water street. 6-sty., 66 ft. frontage. Plans in progress.

Wallacetown, Ont.

Additions. William Eustis of the Ontario Hotel is planning to remodel the building. Electric lighting, plumbing, steam or hot water heating, lavatories, furnishings required.

Windsor, Ont.

Remodelling building for Royal Bank of Canada. Plans to be prepared at once. Office furniture required.

Winnipeg, Man.

A. Feinstein, 460 Selkirk ave., will erect a corrugated iron storage shed, 16 x 20, in rear of above address.

Extension to plant planned for the Strong-Scott Mfg. Co., 774 Dufferin ave., manufacturers flour milling machinery. Mgr., E. H. Franke.

Storage shed planned at city yards, Ross avenue. Specifications at office of engineer, H. N. Ruttan, 223 James Ave. Tenders received by secretary until Jan. 17, 1913.

Improvements to hotel to cost $20,000, (Smith-street). Lee & McCarrey (props.) will improve the interior of St. Regis Hotel by installing new restaurant, lunch counter, etc. It is also possible that 3 additional storeys may be added.

CONTRACTS AWARDED

Brantford, Ont.

Factory office to cost $8,600 (Greenwich) for Adams Wagon Co. Ltd. Builder, A. E. Faulkner. 3-sty., 36 x 54, Milton pressed brick construction, stone and cement foundation.

Halifax, N.S.

Printing office, Argyle street, for Dennis Realty Corporation, 108 Granville street. General contractors, Thompson & Theakston. Four storeys, reinforced concrete and structural steel construction.

Hamilton, Ont.

Addition to factory, cost $40,000, for Canada Steel Goods Co., Arthur street. Architects and general contractors, Stewart & Witton, 2 Hughson street S. Architects and general contractors, Stewart & Witton, 2 Hughson street S. Mason, Geo. E. Mills, 614 King streetE. Carpentry, J. Poag & Son, Westinghouse ave. Iron and steel, Hamilton Bridge Works Co., Barton and Bay streets. Two storeys, 150 x 120.

Wash houses for Canada Screw Co., 134 Wellington street N. Architects, Mills & Hutton, Bank of Hamilton Bldg. General contractor, Andrew Gow. Work is being done by day labor. 2-sty., 80 x 40.

Warehouse (remodelling) to cost $20,000, King and John streets, for Heintzman Piano Co., King street E. Architects, Mills & Hutton, Bank of Hamilton Bldg. Carpenter and general contractor, James Mercer, 7 London street. Mason, Samuel Howard, Mary street. Iron and steel, Hamilton Bridge Works Co., Barton & Bay streets. Roofing, Jno. E. Riddell, King street E. Heating and plumbing, Adam Clark, Main street west. Electric work, J. Donaldson, Charlton avenue west. Plastering, J. Clapham & Son, 69 Hughson street N.

Montreal, Que.

Warehouse, cost $17,000, for Dupuis Freres Co., Ltd., 447 St. Catherine St. Architect and general contractor, Louis Beaudry, 2320 Hutchinson street. Two storeys, 88 x 88, solid brick construction, cement foundation, felt and gravel rfg.

Montreal, Que. Westmount

Stables to cost $14,000, Victoria Ave., for W. W. Butler, Transportation Bldg., Montreal. Architect, Robt. Findlay, 10 Phillips Place, Montreal. General contractor, W. S. Robertson, 13 Cartier

Bldg., McGill street, Montreal. Iron and steel, Phoenix Bridge Co., 83 Colborne, Montreal. Sub-tenders received by general contractor after Jan. 15th. 2-sty., 33 x 63, pressed brick and terra cotta construction, stone and cement foundation.

Factory to cost $4,000. Owner and builder, Paul Demers, 115 Van Horne St. 2-sty., 30 x 66, solid brick, cement foundation, felt and gravel roofing.

Stores and dwellings to cost $14,000, Bernard, for Horone Nadone, 1955 St. Laurent street. Architect and general contractor, Chas. Nadone, 1955 St. Laurent street. 3-sty., 50 x 97, solid brick construction, cement foundation. Foundations in.

Stables to cost $7,100, Ontario East, for Montreal Light, Heat & Power Co., Craig street. General contractors, D. G. Loomis & Son, St. Patrick avenue. 2-sty., 73 ft. 6 in. x 62 ft. 6 in., solid brick construction, cement foundation.

St. Catharines, Ont.

Knitting factory (extension) to cost $10,000 for Warren Bros., 215 St. Paul street. Architect, Thos. H. Wiley, 109 St. Paul. General contractors, Newman Bros., 75 St. Paul. 3-sty., 40 x 140, brick, stone foundation.

Sydney, N.S.

Warehouse and office, Brookland St. Owners and general contractors, Chappell Bros. & Co., Ltd., Brookland St. 3-sty., 45 x 40.

Thorold, Ont.

Factory contemplated for Beaver Board Co., Military Rd. and Beaver avenue. President, W. F. MacGlashan. Architect. Private. Builders, Morris & Allen, Builders' Exchange. To be erected this winter. Will manufacture Beaver building board.

Toronto, Ont.

Office building, College street, for I. O. O. F., Room 63, Canada Life Bldg. Grand Sec., W. Brooks. Architect, Herbert G. Paull, 395 College street. General contractor, R. Chalkley & Sons, Janes Bldg. Carpenter, Hutchinson & Son, 771 Shaw street. Iron and steel, Jno. T. Hepburn, 18-40 Van Horne St. Heating, Fred Armstrong Co., 277 Queen street W. 6-sty., stone foundation, structural steel construction, oak floors, felt and gravel roofing.

Factory to cost $4,000, Plymouth Ave., for Thos. Palmer, 148 Ossington avenue. Builder, Geo. T. Lea, 579 Indian road. 2-sty., brick construction, cement foundation, felt and gravel roofing.

Vancouver, B.C.

Hotel, cost $150,000, Hastings street E. for A. H. Clemes. Architect, Emil Guenther, 404 North West Trust Bldg. General contractors, J. J. Frantz Construction Co., 342 Hastings street east. Eight storeys, 50 x 150, brick and structural steel construction.

Residences

Bayfield, Ont.

Summer cottages on Lake Huron, are under the contemplation of a syndicate. Sec., Geo. Rowntree, 60 Stanley street. Work will start in spring. 1½-sty., frame construction.

Elmira, Ont.

Residence planned for Henri Heimbecher, c/o Heimbecher & Jung, Church street. To be built in spring.

Hamilton, Ont.

40 residences (east end) to cost $160,000 for James Bryers, 805 King street E. Site has been purchased. Work to start in spring. 2½-sty., cement foundation, pressed brick construction.

London, Ont.

Parsonage, cost $8,000, for Dundas Centre Methodist Church Congregation. Pastor, Rev. Dr. Thos. Manning, 484 Dundas street. Congregation will discuss remodelling of present parsonage into building to be used for young men's work, to include gymnasium and lecture rooms. Further information from Pastor.

Vancouver, B.C.

Apartments, cost $200,000, Chilco St., for J. A. Russell, 837 Hastings street W. Architect, H. B. Watson, 16 Hastings St. E. Six storeys, concrete construction, steam heating. Tenders will be called at once.

Rectory for All Saints Church Congregation. Architects, Grant, Henderson & Cook, 413 Granville street. Plans, etc., at office of architects. Tenders called.

Wallaceburg, Ont.

Residence to cost $4,000 for First Baptist Church. Architects, J. L. Wilson & Son, Chatham, Ont. 2½-sty. and basement, 36 x 30, cement foundation, pressed brick construction, concrete basement. Plans prepared.

Winnipeg, Man.

Residence to cost $15,000 contemplated, Scotia street, for D. A. Downie, c/o Bulmer, Downie, Reid & Curle, 1102 McArthur Blk. Plans not yet prepared.

CONTRACTS AWARDED

Belmont, Ont.

Residence to cost $3,500 for A. Harkness. General contractor, Turner Bros. Work to start shortly. 1½-sty., brick construction.

Brantford, Ont.

Residence, Erie Ave. Owner and builder, A. E. Faulkner, 147 Erie avenue. 1½-sty., 23 x 36, Milton pressed brick construction, cement foundation.

Hamilton, Ont.

Residence, cost $2,500, Fairholt road, for H. Ardrup, 145 Grant ave. Builder, C. Courtney, 30 Fairholt road. Brick, stone foundation.

Residence to cost $3,000. Owner and general contractor, Stewart Bros., 1 Hyde Park avenue. Cement foundation, pressed brick construction.

4 residences to cost $8,000, Gilkinson, for H. G. McLaren, 70 Charlton avenue E. General contractors, Hysert & Hildreth, 188 Gibson avenue. Stone foundation, brick construction.

3 residences to cost $6,000, Kent, for A. E. Yeager, Simcoe, Ont. General contractor, R. Tope, 191 Robinson St. Cement and stone foundation, pressed brick construction.

Montreal, Que.

Alterations and addition to residence to cost $8,000. Owner and builder, Paul Demers, 115 Van Horne. [illegible]

solid brick, cement foundation, felt and gravel roofing.

Residence to cost $2,500, Jerome, for J. E. Sanregret, 33 Jerome street. Bldr., Albert Brouillet, 191 Marguerette street. 2-sty., 25 x 35, brick, cement foundation, felt and gravel roofing.

Residence to cost $3,500 for Ben Simon, 1980 Papineau avenue. Builder, A. Shipson, 1980 Papineau avenue. 3-sty., 25 x 36, brick, cement foundation, felt and gravel roofing. Foundations in.

Residence to cost $10,000, Westmount (Western avenue), for T. M. Macaulay, 4007 Dorchester street, Montreal. Architect, Rob't. Findlay, 10 Phillips Place, Montreal. Roofing, Geo. W. Reed & Co., 37 St. Antoine street. Sub-tenders received by architect after Jan. 12th. 2-sty., 63 x 43, pressed brick construction, cement foundation.

Residence to cost $4,500, College St. Owner and builder, Napoleon Daoust, 102 College street. 3-sty., 35 x 36, solid brick, cement foundation, felt and gravel roofing. Foundations in.

Toronto, Ont.

Apartments, cost $15,000, Rowanwood ave., for J. P. Milnes, 103 Roxboro St. E. Architect, C. B. Hoole, 6 Marlborough ave. Carpentry, Davis & Son, 49 Muir ave. Two storeys and basement, brick construction. Foundations in.

Pair residences to cost $5,000. Architect and builder, W. H. Avison, 53 Edna avenue. Stone foundation, brick construction. Plans ready.

Vancouver, B.C.

Apartment building to cost $13,000, Hastings and Jackson streets. Owners and general contractors, Messrs. Morden, Thornton, Kilroy and Morgan. Architects, Braunton & Leibert, 142 Hastings street west. General contractors, owners. 6-sty., brick and mill construction.

Power Plants, Electricity and Telephones

Montreal, Que.

Power house to cost $3,500, Barrie and McCord streets, for Montreal Tramways Co., 78 Craig street. Engineer, Jos. D. Evans, 78 Craig street. Foundation for new motor generator set, also beam posts for 15 ton mono rail hoist as per plans 30 M.B.A. Work in progress.

Parry Sound, Ont.

Electric lighting system (improvements) to cost $5,500. Chairman Com., J. A. Duryer. Engineer in charge, G. Groves, Supt. Ratepayers voted on by-law Jan. [illegible]

Sarnia, Ont.

Electric lighting system (extension) planned by town council. Mgr., Dr. Bell. Tenders will be called for shortly for a large number of additional electric lights. Mayor Bell has charge of matter.

St. Catharines, Ont.

Extension to gas plant to cost $7,000, planned by city council. Engineer in charge, Edward [illegible]. Ratepayers voted on by-law Jan. [illegible]

Sydney, N.S.

The Maritime Telegraph & Telephone Co. Ltd., Supt., W. A. Winfield, head

(Continued on page 76)

Tenders and For Sale Department

Tenders for Pier

[illegible] Monday, the [illegible] day of January, 1913 [illegible]

[illegible] tender to name date by which to be completed.

[illegible] which will be returned if [illegible]

(Signed) P. A. MALCOLMSON,
County Clerk,
[illegible], Ont.

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope "Tenders for Valves," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following valves, F.O.B. Port Arthur:—

24 in. Gate Valves, equipped with operating gears	30
12 in. Gate Vales, without gears	9
24 in. Check Valves, with 3-in. by-pass ..	2

Specifications can be seen at the office of the City Engineer, Port Arthur, or the office of the Contract Record and Engineering Review, Toronto, Ont.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur,
December 28th, 1912. 1-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope, "Tenders for Lapwelded Steel Pipe," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following Lapwelded Steel Pipe, F.O.B. Port Arthur:—

24-in. Pipe, 5 16-in. metal, Bell & Spigot joints, 40,200 lineal feet.

24-in. Pipe, 5 16-in. metal, flanged joints, 2,700 lineal feet.

24-in. Pipe, ¼-in. metal, flanged joints, 2,700 lineal feet (Alternative)

12-in. Pipe, 3 16-in. metal, Bell & Spigot joints, [illegible] lineal feet.

Also specials and flexible joints for the above, as per list furnished with the specifications.

Specifications can be seen at the office of the Contract Record and Engineering Review, Toronto, or the office of the City Engineer, Port Arthur.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur.
[illegible] 28th, 1912 1-5

CITY OF MOOSE JAW
SASKATCHEWAN

Tenders for Electrical Machinery

Sealed tenders marked "Tenders for turbo-generator" will be received by the City Commissioners, Moose Jaw, Sask., up to 12 o'clock noon on **Monday, February 10th, 1913**, for the manufacture, supply, delivery and erection of one 1,500 kw. steam turbine and generator.

Specifications and general conditions may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw; The Commercial Intelligence Branch, Board of Trade, 73 Basinghall street or London Chamber of Commerce, London, England.

The lowest or any tender not necessarily accepted.

A. W. MAYBERY,
L. W. RUNDLETT, Commissioners.
W. F. HEAL,

2-4

PROVINCE OF QUEBEC

Department of Roads
QUEBEC

Sealed tenders, addressed to the undersigned, and endorsed "Tenders," will be received at this office until 4 p.m. on **Monday, January 27th, 1913**, for:

1.—Grading of about 155 miles of road between Saint Augustin, Co. Portneuf, and Charlemagne, Co. L'Assomption.

2.—Construction of culverts and small bridges on the same road.

3.—Paving of about 30 miles of road in macadam or concrete or bituminous macadam pavement between Charlemagne, Co. L'Assomption, and Berthier, Co. Berthier.

Each tender must be accompanied by an accepted cheque on a chartered bank payable to the order of the Honorable the Minister of Agriculture and Roads, equal to a certain amount of the tender, which will be forfeited if the persons tendering decline to enter into a contract when called upon to do so. If the tender be not accepted the cheque will be returned. The amount of such cheques, for each of the three items above mentioned is indicated in "Information for proposers." This information will be supplied on demand.

Tenders may be made for the three items or for any item separately.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signature, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

The Department does not bind itself to accept the lowest or any tender.

By order,

B. MICHAUD,
Deputy Minister of Roads.
Quebec December 24th, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department. 2-4

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors and manufacturers read the "Contract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect.

No extra charge is made for filing plans at one or all four offices.

Contract Record and Engineering Review

Montreal—B34 Board of Trade.
Toronto—220 King Street West.
Winnipeg—Commercial Travellers' Bldg.
Vancouver—429 Pender Street.

Sealed tenders addressed to the undersigned and endorsed "Tender for Public Building, Brantford, Ont.," will be received at this office until 4 p.m., on **Monday, February 3, 1913**, for the work mentioned.

Plans, specifications and form of contract can be seen and forms of tender obtained at the office of Mr. Thos. Hastings, Clerk of Works, Postal Station "F." Yonge Street, Toronto, at the Post Office, Brantford, Ont., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.
Department of Public Works,
Ottawa, January 3, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—31129. 2-3

Extension of Time

Notice is hereby given that the time for the reception of tenders for Dredging at False Creek, Vancouver, B.C., is extended to **Monday, February 17, 1913.**

[illegible] DESROCHERS,
[illegible]

Department of Public Works,
[illegible] 3

CITY OF VANCOUVER

Tenders for Georgia-Harris Bridge

Tenders will be received by the undersigned up to **Thursday, January 30th, 1913,** at 3 p.m., for the construction of Georgia-Harris Viaduct.

Plans and specifications, and form of tender may be obtained at the office of C. A. P. Turner, Engineer, room 424 Vancouver Block City, or plans may be seen at the office of the City Engineer, City Hall.

A deposit of $50 will be required on plans given out.

A deposit of 2½ per cent. of the amount of the contract must be made with each tender, by marked cheque payable to the City Treasurer.

The lowest or any tender not necessarily [illegible]

Wm. McQUEEN, City Clerk.

City Hall, Vancouver, B.C.,
December 21, [illegible] 3-4

Sealed tenders addressed to the undersigned, and endorsed "Tender for Construction of Two Steel Hopper Scows, 500 yards capacity each," will be received at this office until 4 p.m. on **Monday, January 27, 1913,** for the construction of two 500 cubic yards capacity Steel Hopper Scows.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the offices of T. H. Schwitzer, Esq., Mech. Superintendent Birks Building, Ottawa, Ont.; J. G. Sing, Esq., District Engineer, Confederation Life Building, Toronto, Ont.; Collectors of Customs at Kingston and Collingwood, Ont.; C. E. W. Dodwell, Esq., District Engineer, Halifax, N.S. and H. H. Donnelly, Esq., Supt. of Dredges, St. John, N.B.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, January 2, 1913.

Newspapers will not be paid if this advertisement is inserted without the authority of the Department.—32704. 2-3

Derrick Wanted

WANTED [illegible] working order. State price. Reid & Brown, 63 Esplanade East, Toronto, Ont. 3-4

Sealed tenders addressed to the undersigned, and endorsed "Tender for Montreal, P.Q., Postal Station 'H,'" will be received at this office until 4 p.m. on **Monday, February 10, 1913,** for the construction of the building mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the [illegible] Crescent street, Montreal, Que., and at this Department.

P[illegible] not be considered unless made on the printed forms supplied, and signed with their actual signatures stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
[illegible]

Department of Public Works,
Ottawa, January 11, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department. 31694. 3-4

CITY OF REGINA, SASK.

REGINA MUNICIPAL RAILWAY.

TENDERS

FOR

TRACK and TROLLEY MATERIAL

[illegible] envelope "Tenders for the Supply of Street Railway Materials," and addressed to the City Commissioners, Regina, Sask. Canada, will be re[illegible] **Monday [illegible] 24th day of February, 1913** [illegible] ply of:—

CONTRACT D.

[illegible]
1550 pairs 6 hole 26 in. splice bars for Lorain rail section 80-335
[illegible] long tons street railway Tee rails, 60 lb. A.S.C.E. section.
2000 pairs 4 hole 24 in. angle bars for 60 lb. A.S.C.E. steel rails.
10000 track bolts and nuts, 3½ in. x 1 in., oval heads, hexagon nuts.
9000 track bolts and nuts, 3¼ in. x [illegible] in., oval heads, hexagon nuts.
[illegible]
[illegible]
600 kegs (each keg 200 lbs.) standard railroad spikes, 5½ in. x 9/16 in.

CONTRACT E.

[illegible]
3600 4/0 standard copper rail bonds, 13 in. C/C.
630 4/0 solid copper rail bonds, 62 in. C/C
60 4/0 solid copper rail bonds, 72 in. C/C

CONTRACT F.

[illegible]
[illegible]
[illegible]

CONTRACT G

[illegible]

CONTRACT H.

21 miles 2/0 hard drawn trolley wire.
12 miles 4/0 D.B.W.P. 19 stranded copper wire
4 miles 2/0 D.B.W.P. 7 stranded copper wire
10 miles 3/8 in. stranded soft drawn iron wire.

CONTRACT J.

Insulators, Hangers, Brackets, Pullovers, Turnbuckles, Trolley Frogs, Crossovers, Clinch Ears, Pole Line Hardware, etc., etc.
All material to be delivered F.O.B. Regina, Freight and duty PAID

[illegible] tract, and other particulars can be had upon application to H. Doughty, Superintendent, the Regina Municipal Railway, Regina, Sask., Canada.

Persons tendering are notified that tenders will not be considered [illegible] the Superintendent.

[illegible] of the bid (made payable to the City Treasurer) must accompany each tender.

[illegible]

R. MARTIN, Mayor
G. A. MANTLE,
L. A. THORNTON,
City Commissioners.

Wanted

[illegible] The Derrick is to handle a [illegible] lifting four tons on single wire. [illegible] first class condition. Reply, [illegible] Box 68, [illegible] 3

Extension of Time

[illegible] hereby given that the time for the [illegible] further extended to **Monday, January 20, 1913.**

[illegible]

[illegible]
Secretary.

[illegible] 1913 3

Extension of Time

City of Edmonton
Engineering Department

Invitation to Tender

[illegible] marked on the outside of the envelope "Tenders for Trunk Sewer Extensions," and addressed to the City Commissioners, Edmonton, Alberta, Canada, will be received up to 6 p.m., **January 29th, 1913,** for the construction in tunnel of:

Contract **No. 3.**
4050 lin. ft. 8-ft. dia. sewer.
2200 lin. ft. 6-ft. 6-in. dia. sewer.
1950 lin. ft. 4-ft. dia. sewer.
and accessories.

Contract **No. 4.**
6200 lin. ft. 4-ft. dia. sewer, and accessories.

Contract **No. 5.**
1200 lin. ft. 6-ft. dia. sewer.
4050 lin. ft. 5-ft. dia. sewer.
1620 lin. ft. 4-ft. 6-in. dia. sewer,
and accessories.

Contract **No. 6.**
1400 lin. ft. 6-ft. dia. sewer.
2750 lin. ft. 5-ft. dia. sewer.
3750 lin. ft. 4-ft. 6-in. dia. sewer.
3400 lin. ft. 4-ft. dia. sewer.
and accessories.

Contract **No. 7.**
4050 lin. ft. 4-ft. dia. sewer.
2500 lin. ft. 5-ft. dia. sewer,
and accessories.

Contract **No. 8.**
4700 lin. ft. 6-ft. dia. sewer.
4740 lin. ft. 5-ft. dia. sewer.
2450 lin. ft. 4-ft. dia. sewer.
and accessories.

Each tender must be accompanied by an accepted cheque, payable at par Edmonton, drawn in favor of the City of Edmonton to the amount of one (1 p.c.) per cent. of the tender submitted as a guarantee that, should the work be awarded, the bidder is able and willing to enter into and carry out the contract.

Each bidder may tender on one or more or all [illegible]

The lowest or any tender not necessarily accepted.

Plans and specifications may be seen at the [illegible] of the City Engineer, Edmonton, Alberta, [illegible]t Record & Engineering Review, Toronto; [illegible]an Engineer, Toronto; Engineering Record, New York, or a complete set of plans and specifications for any contract will be sent on a deposit of Twenty-five ($25.00) Dollars, and a set covering all the contracts on a deposit of One hundred ($100.00) Dollars. This deposit will be returned if plans and specifications are returned within fourteen (14) days of closing of tender.

[illegible] COMMISSIONERS.

Hammer Wanted

WANTED Hammer for driving piles, 2,000 lbs. weight. Give description and price to Box 685, Contract Record, Toronto, Ont. 3

Harris Excavator

For sale, mounted on wheels for track, 18 cu. ft. Orange-peel Bucket, capable of digging to a depth of 20 feet. In good working order. Machine at present located in Montreal. Box 674 Contract Record, Toronto, Ont. 1-3

Situations Vacant

WANTED Experienced plumbing goods salesman to travel throughout Ontario, Manitoba Saskatchewan and Alberta, to represent large American manufacturing concern. Address Box 684, Contract Record, Toronto, Ont. 3-6

Situations Wanted

WANTED—Position with good contracting firm, by sober, industrious man, with 15 years' experience in building line. Experience and testimonials on application to Box 683, Contract Record, Toronto, Ont. 3-3

Power Plants, Electricity and Telephones

(Continued from page 67)

office Halifax; Engr., L. A. Dolan, contemplates improving whole system each of Halifax, also making several extensions. Switchboards will be installed at North Sydney and Sydney Mines Exchanges.

Toronto, Ont.
By-laws carried, providing for the hydro-electric system at the following places: Beaverton—clerk, J. H. Ruppel; Goderich—clerk, L. L. Knox. Mayor, Chas. A. Reid; Markham—clerk, M. White; North Bay—clerk, M. W. Flannery, Mayor, Geo. W. Lee; Peterboro—clerk, S. R. Armstrong; Stayner—clerk, Jno. Hood, Mayor, D. G. Bell; Stouffville—clerk, John Urquhart; Waterford—clerk, James Ross; Uxbridge—clerk, M. H. Crosby, Mayor, T. C. Nicholls.

Walkerton, Ont.
Clerk, J. H. Scott. Ratepayers voted on by-law to extend electric lighting system and grant franchise for 5 years.

Winnipeg, Man.
Extension of power sub-station building at McPhillips street pumping station, cost $11,000, planned by Board of Control. Secretary, M. Peterson. Engineer, J. G. Glassco, 54 King street. 55 x 30, brick construction. Tenders to be called shortly. Work to be completed June 1st.

Electric lighting plant planned (St. Charles), for Rural Municipality of Assiniboia. Sec.-treas., Frank Ness, Kirkfield Park, Man. Specifications, etc., at office of sec.-treas. Installation and construction of plant and system, erection of poles, wires, etc., probably internal combustion motor plant.

Miscellaneous

Brampton, Ont.
Fire apparatus to cost $7,000 planned by town council. Clerk, W. H. McFadden. Ratepayers voted on by-law Jan. 6th.

Niagara Falls, Ont.
Fire protection system to cost $3,000 planned by city council. Mayor, O. F. Dores. Clerk, W. J. Seymour. By-law passed.

Sydney, N.S.
Machinery, etc. Sydney Foundry & Machine Co., Ltd., contemplate installing new forging equipment, travelling crane and latest type of casting machinery. Sec.-treas. and manager, W. E. Clarke.

Winnipeg, Man.
Supply of brass goods required by Board of Control. Sec., M. Peterson. Specifications, etc., at office of engineer, H. N. Ruttan, 223 James avenue. Tenders received by secretary until Jan. 20, 1913.

Copper wire. Board of Control. Sec., M. Peterson. Engineer, J. G. Glassco, 54 King street. Contract for 0,000 lbs. No. 8, weatherproof copper wire awarded equally to E. E. Phillips, Electrical Works, Ltd., 601 Union Bank Bldg., and Canada Wire & Cable Co., 272 Main street, at $21.58 per 100 lbs.

Business Notes

Arcola, Sask.
Hardware store of J. R. Mear, Main street, destroyed by fire; loss $8,000.

Factory of Standard Aerated Water Company destroyed by fire; loss $3,000.

Belmont, Man.
Bank of British North America building here destroyed by fire; loss $10,000. Head office, Montreal.

Chatham, Ont.
Boot and shoe store, 88 King street, burned; loss $30,000; owned by Presbyterian Church (Trustee Board). Occupied by G. Cowan. Loss practically covered by insurance. Mr. Cowan will secure temporary quarters and fit up new store. The Trustee Board contemplates erecting new building and will have estimates prepared shortly.

Georgeville, Que.
"Lake House" destroyed by fire; loss $12,000. Will rebuild. New building to be of frame construction, concrete foundation. Sanitary equipment and hotel furniture required. Further particulars from sec.-treas. of Municipality of Magog, Que.

Matane, Que.
Store and residence of Auguste Cote burned. Will rebuild. New building to be of stone and brick, metal roofing, plastering, sanitary equipment, store fixtures required. To cost $8.000.

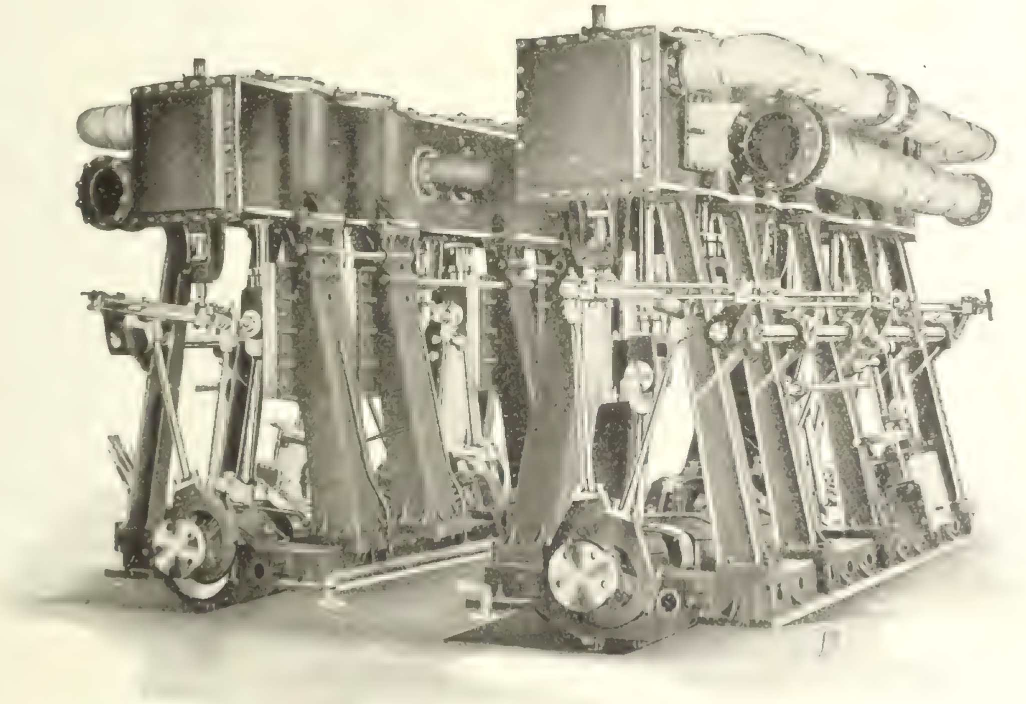
South Battleford, Sask.
The Occidental Hotel, owned by S. L. White, destroyed by fire.

The Gaiety Theatre Bldg. was destroyed by fire. Owned by the Masonic Order.

St. John, N.B.
American Steam Laundry, Charlotte street, burned; loss $16,000. (Godsoe Bros., c/o F. C. Godsoe, 30 Orange St.) Will probably rebuild. Machinery required.

Wapella, Sask.
Hotel, store, etc., burned; owned by

ENGINES and BOILERS



Marine Engine built for the R. & O. Nav. Co.'s Steamer "Rapids Prince."

We make Boilers of every kind for any service. Engines, Pumping Machinery and heavy Plate work. "Inglis" indicates the best in Quality, Design and Workmanship.

Write us for particulars

The John Inglis Co., Limited

ENGINEERS AND BOILERMAKERS

14 Strachan Avenue Toronto, Canada

[illegible] (prop. Queens Hotel), S. Ral[illegible] [illegible] $[illegible]; D[illegible] & Mc[illegible] [illegible] $[illegible]; also an oil [illegible] [illegible] $1,600.

New Companies

Florence Power, Light & Milling Co., Ltd., has been incorporated with a capital of $[illegible] for the purpose of developing, producing, generating and transmitting electric power, with head office at [illegible]. The provisional directors are J. A. MacLean, merchant; S. P. Campbell, speculator, and W. R. Hickey, solicitor, all of [illegible].

[illegible] Brick Company of Canada, Limited has been incorporated with a capital of $[illegible] to manufacture and deal in brick, terra cotta, tiles, etc., with head office at Hamilton. The provisional directors are J. D. Ramsay, Wm. G. [illegible], manufacturers, and C. W. Cle[illegible], [illegible], all of the Borough of St. Marys, Pennsylvania, U.S.A.

Hyde & Sons, Limited, have been incorporated, with a capital stock of $100,000, to carry on business as general contractors, etc., with head office at Montreal. The incorporators are Francis Hyde and George Hyde, merchants, of Outremont, and L. H. Boyd, K.C., of Montreal.

[illegible] Lumber & Saw Company, Limited, has been incorporated with a capital stock of $60,000, to carry on business as lumber dealers, saw and planing millers, etc., with head office at Montreal. The incorporators are A. P. Beaupre, merchant, J. H. Poulin, manager, and Victor Martineau, advocate, all of Montreal.

Concrete Products Limited, incorporated with a capital stock of $200,000, to manufacture and deal in concrete and cement in all form, with head office at Montreal. The incorporators are A. O. Dawson, manufacturer, J. P. Anglin, contractor, of Westmount, and J. A. Ewing, K.C., of Montreal.

Canadian Watson Solar Window Company, Limited, has been incorporated, with a capital stock of $50,000, to carry on a general building and construction business, with head office at Montreal. The incorporators are G. R. Drennan, stenographer, M. J. O'Brien, and H. W. Jackson, clerks, all of Montreal.

Merrill Process Company, Limited, has been incorporated with a capital stock of $10,000, to carry on business as mechanical and constructing engineers, with head office at Montreal. The incorporators are R. C. Smith, F. H. Markey, K.C., and R. C. Grant, accountant, all of Montreal.

Canada Crushed Stone Corporation, Limited, has been incorporated with a capital of $1,500,000 to manufacture and deal in all kinds of stone with head office at Hamilton. The provisional directors are G. H. Levy, M. J. O'Reilly and A. H. Gibson, barristers, all of Hamilton, Ont.

The Etobicoke Realty Limited has been incorporated with a capital of $100,000 to carry on business as a general land and building company, with head office at Toronto. The provisional directors are R. D. Story, A. S. Lown, solicitors, Dr. W. E. Ferguson, all of Toronto, Ont.

Permanent Realty Corporation, Limited, has been incorporated with a capital of $100,000 to carry on business as a general land and building company, with head office at Toronto. The provisional directors are C. B. Scott, Dan. Urquhart, barristers, and W. P. Crow, law clerk, all of Toronto.

Fairbank Land Company, Limited, has been incorporated with a capital of $300,000 to carry on business as a general land and building company, with head office at Toronto. The provisional directors are Harry Riley, W. B. Sturrup, and W. R. Anderson, law clerks, all of Toronto.

H. LONGHURST F. E. COOPER J. V. CUTTRISS

Hamilton Art Glass Co.

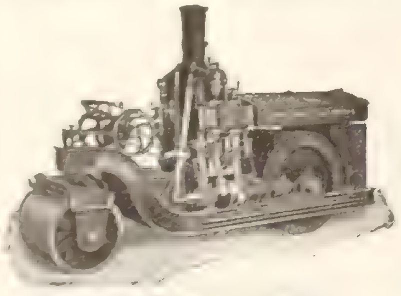
143½ King St. East, Hamilton, Ont.
Telephone 3537

Glass of all kinds and Patterns for Dwellings, Stores, Offices, Public Buildings and Churches.

Church and Domestic Art Glass
in Lead, Electroglazed and Copper Bar

Ornamental Chipped and Sand Cut Glass. Bevelled Plate and Mirrors. Plate and Window Glass

ERIE MACHINE SHOPS



"Our 20th Century Roller"

P. W. DIETLY
Proprietor

Send for our Catalogue of Asphalt Rollers and Mixers.

1303 PEACH STREET - ERIE PA.

Tenders Wanted

should be advertised for in the "Tenders and For Sale Department" of the CONTRACT RECORD AND ENGINEERING REVIEW. This paper is the "Tender Ad." medium of Canada and always brings bids from the reliable contractors and supply houses.

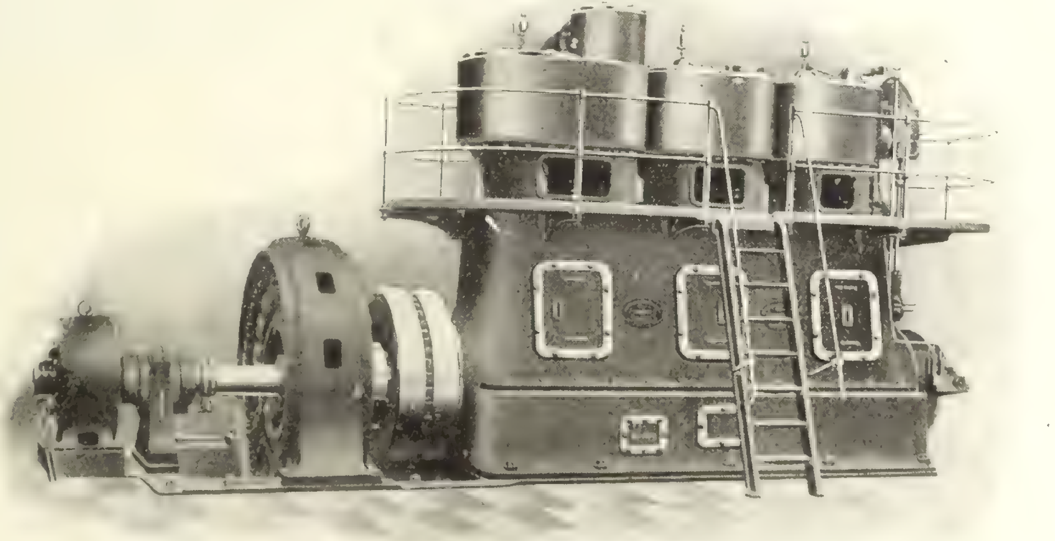
File your plans for any work on which you are inviting bids, in our offices at Toronto, Montreal, Winnipeg or Vancouver.

Contract Record
and Engineering Review
Toronto Ontario

THE "BROWETT-LINDLEY"

Enclosed, quick-revolution, forced lubrication, steam engines

These engines are built by Browett, Lindley & Co., Limited, Manchester, Eng., and have established an enviable reputation in electric power and tramway plants, collieries, cotton and paper mills, steel and iron works. They are made in five different varieties to suit steam pressure and working conditions.



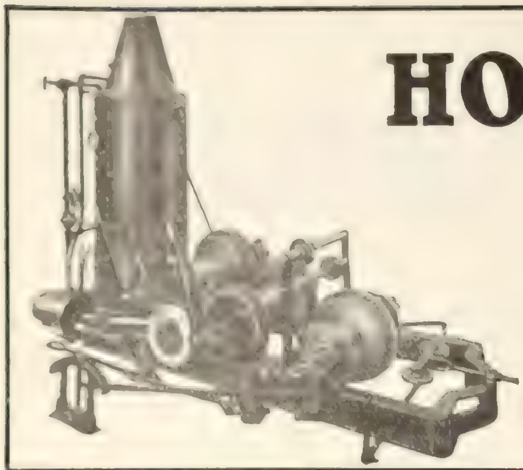
"Browett-Lindley" two-crank, compound, central valve, forced lubrication engine, driving electric generator

Sole Agents for Canada

THE JOHN McDOUGALL
CALEDONIAN IRON WORKS CO., LIMITED

Works: Seigneurs & William Sts., MONTREAL Sales Offices; MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery, Pumps, centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants.



HOISTING ENGINES

Some of the strongest friends of the M. & H. Hoists are to be found among the men who have owned and used them. For instance the following written by one of the Lumber Kings of Canada a man who telegraphed us an unsolicited order for another hoist not long ago.

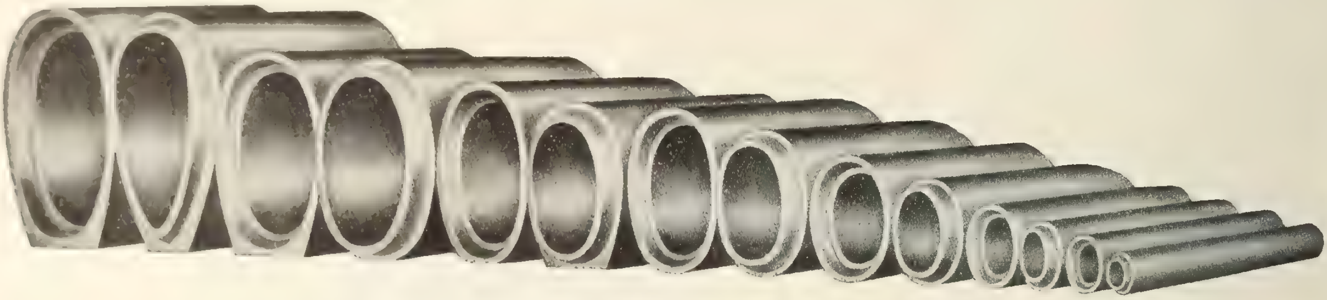
"Answering your enquiry, I am pleased to state that the hoists with which you supplied me some years ago have given good satisfaction and have been in pretty constant use ever since.

No other Hoist in Canada has so many practical improvements as the M. & H. Hoist for 1912. Let us tell you about them.

Marsh & Henthorn, Limited

Sales Agents: MUSSENS Limited, Montreal

Belleville, Ontario



Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

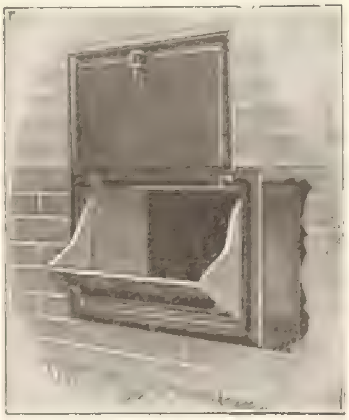
STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario



EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

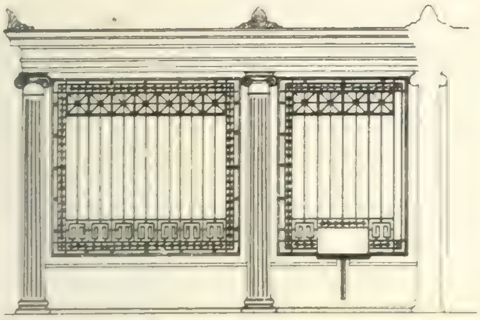
Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative: E. F. Dartnell, No. 8 Beaver Hall Square

Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta



Send for
Section A
of our
new loose
leaf
Catalogue

Metal Work for Banks and Offices

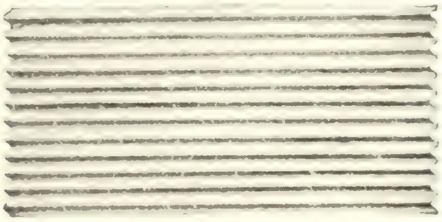
Counter Grills Wickets
Tellers Cages, Brass Floor Railings
Door and Window Grills

We have a large, modern plating plant, enabling us to furnish all the latest electro-plated finishes.

Dennis Wire & Iron Works Co.
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET

Iron Corrugated

BLACK, PAINTED OR GALVANIZED
Straight or Curved
Stock carried of all gauges, lengths up to 10 feet.



RIDGES FLASHINGS CLEATS BOLTS
and all other necessary sundries.
We Specialize on
Curved Sheets for Concrete Supports

The Metallic Roofing Co., Ltd.
MANUFACTURERS
Toronto, Ont. Winnipeg, Man.
(C 33)

Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath

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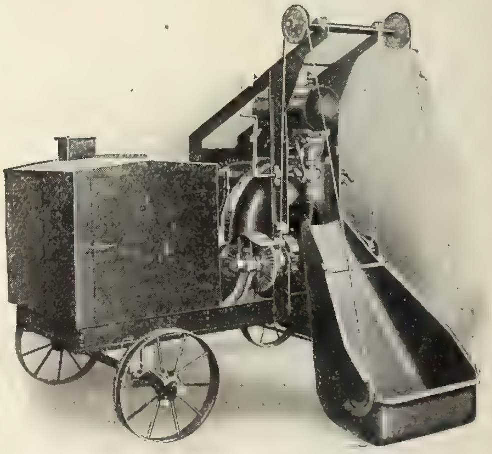

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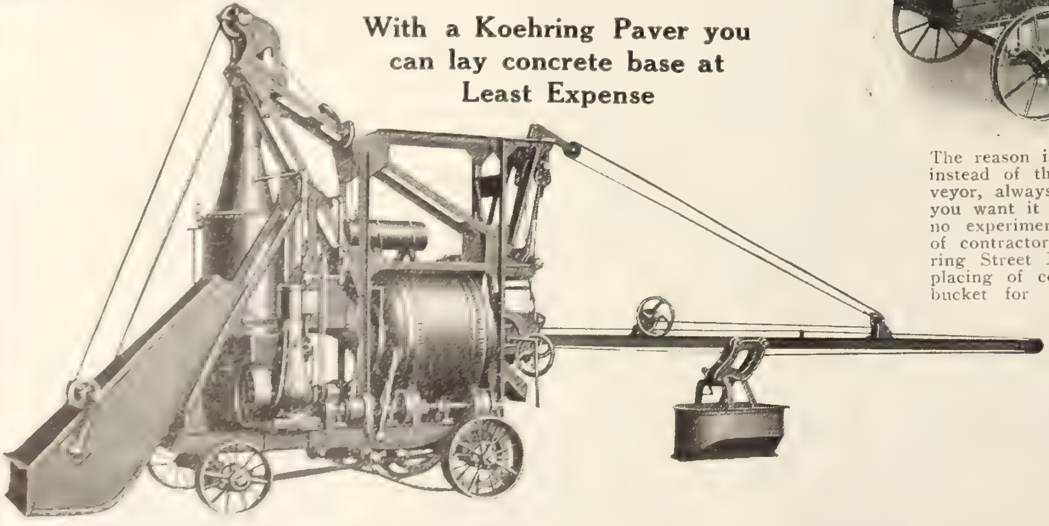

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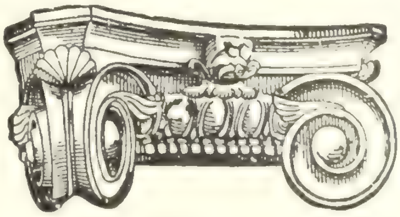

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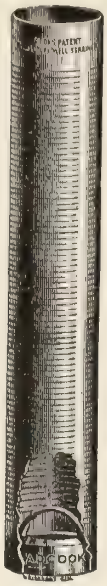

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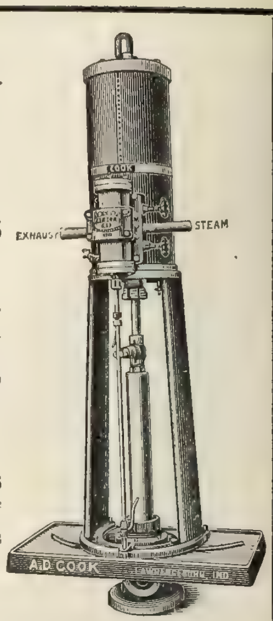

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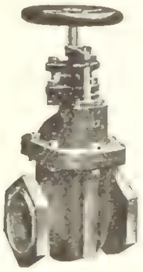

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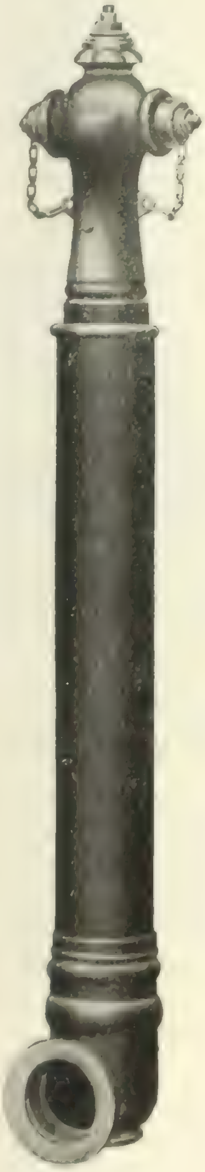

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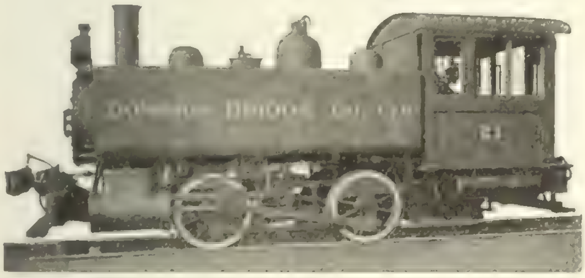

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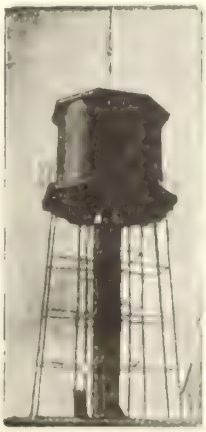

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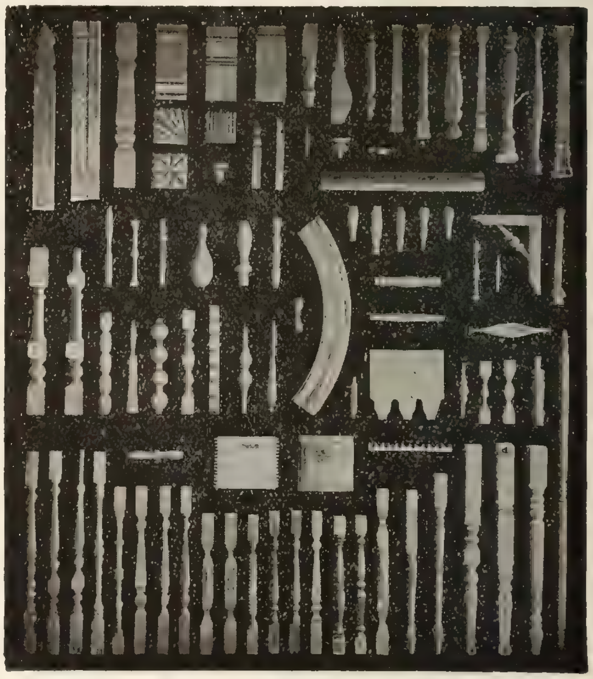

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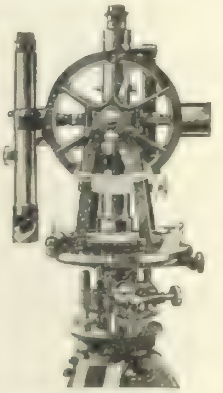

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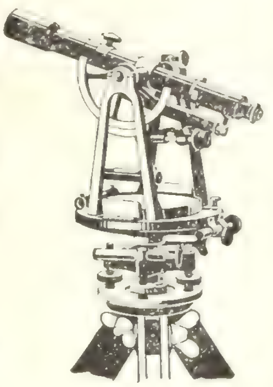

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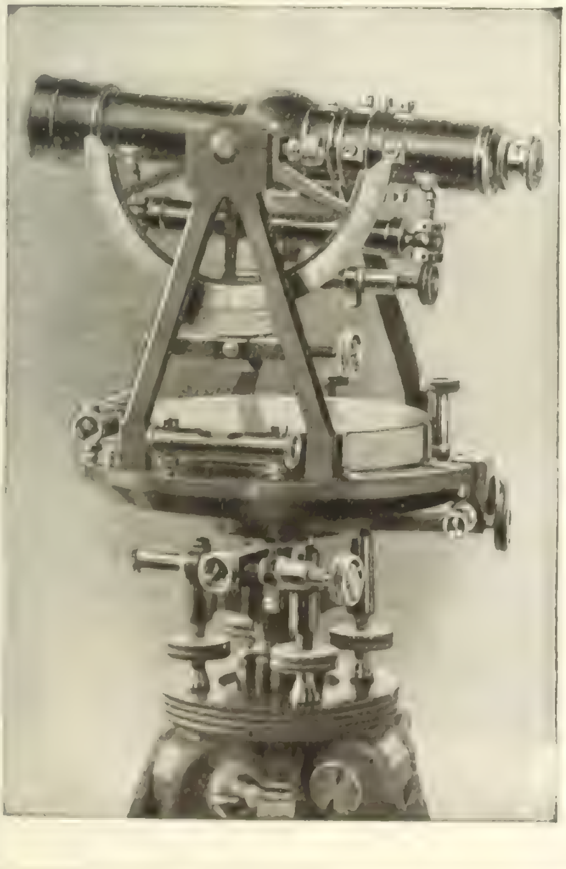

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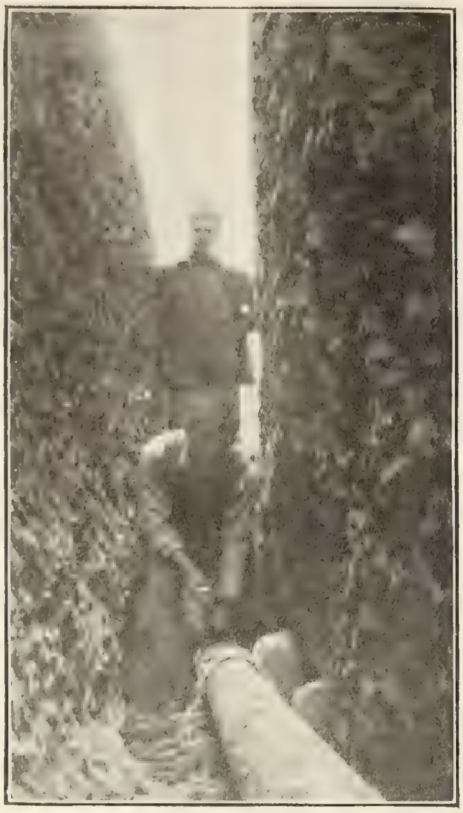

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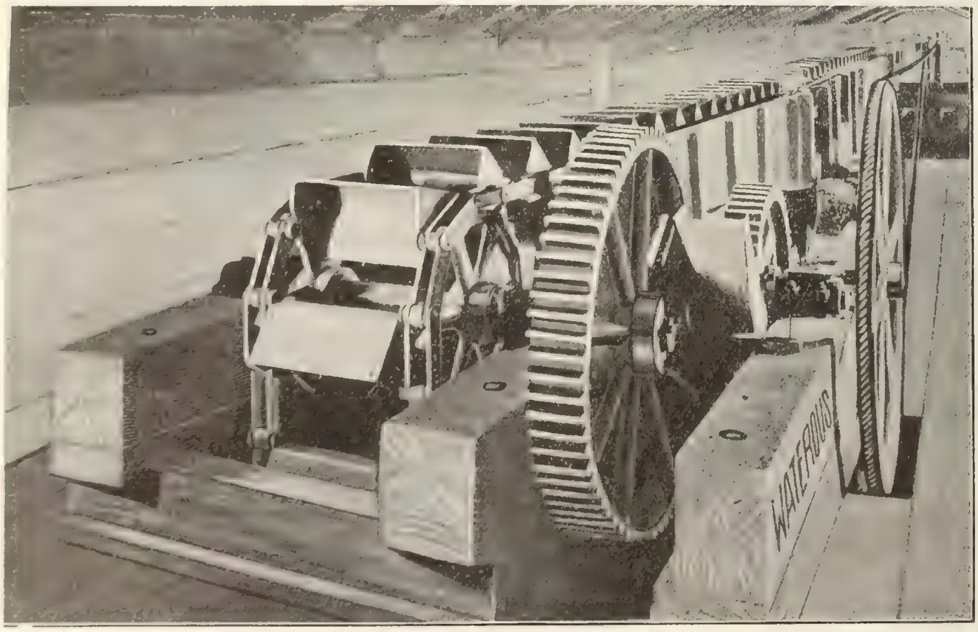

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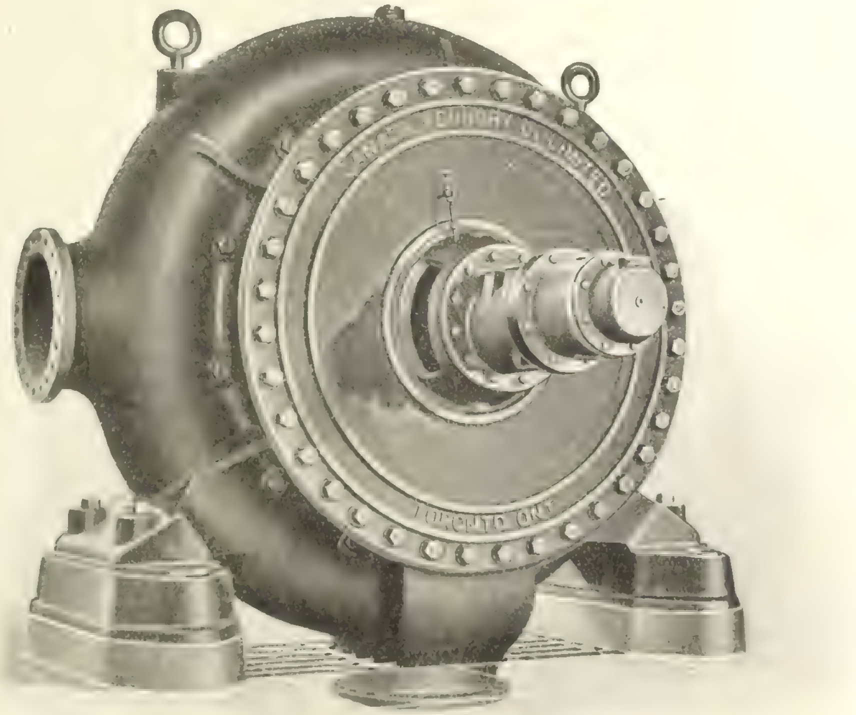

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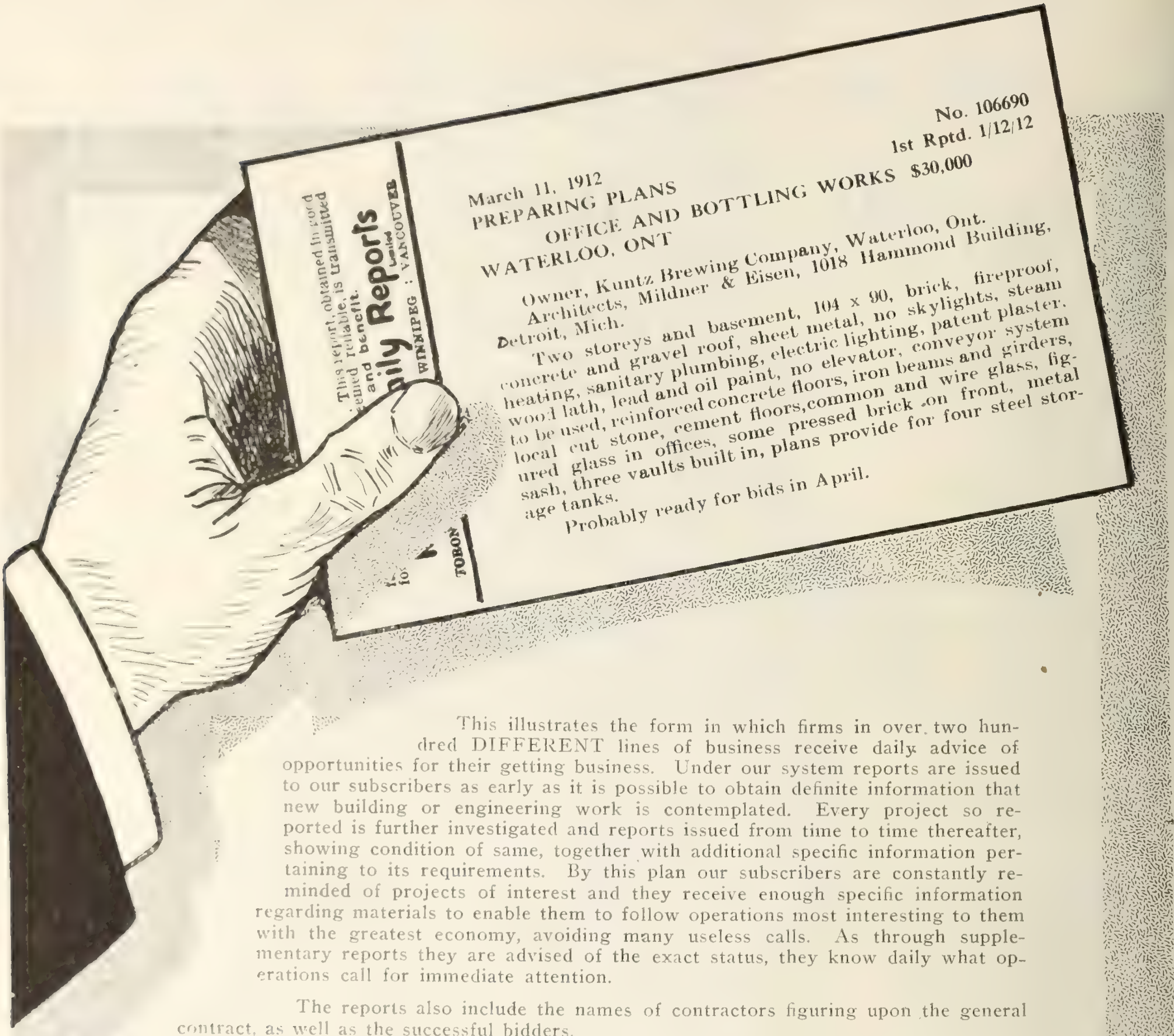

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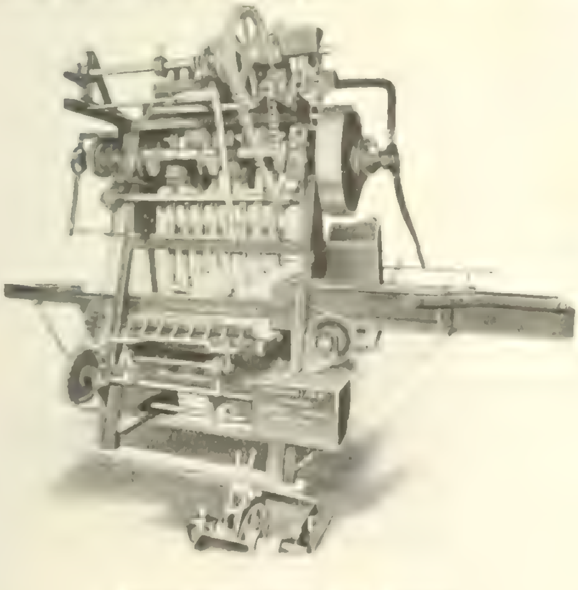

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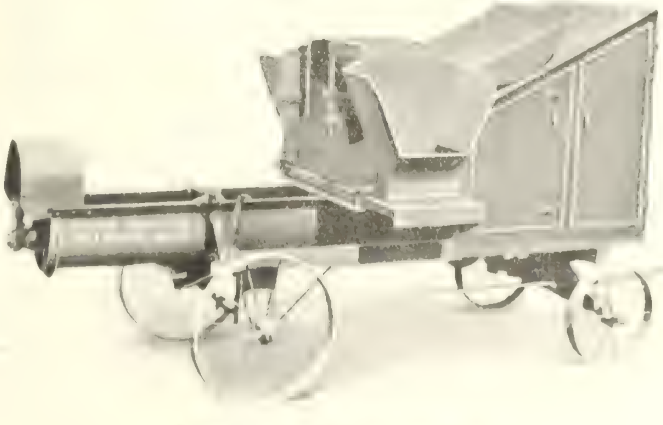

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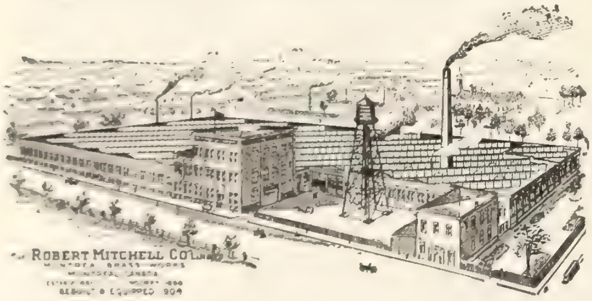
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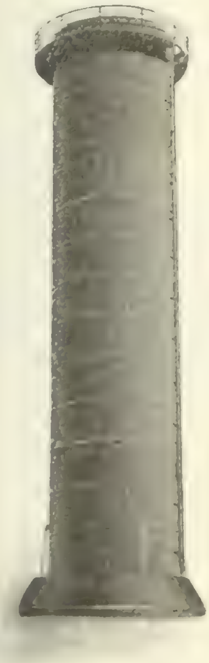

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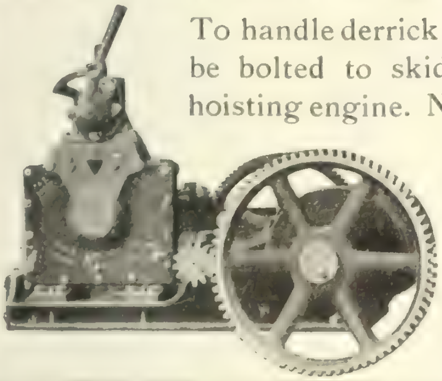

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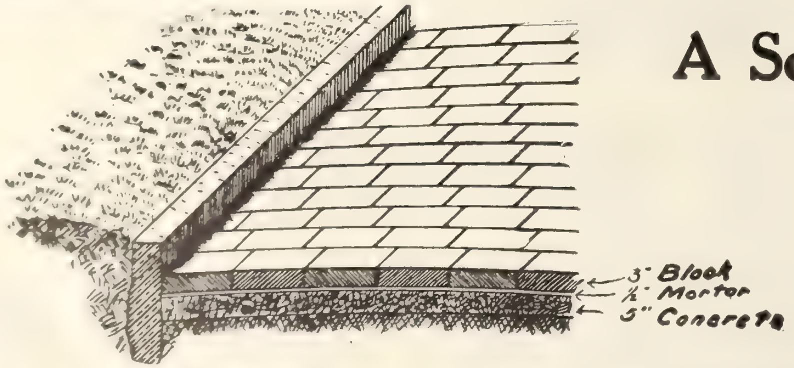

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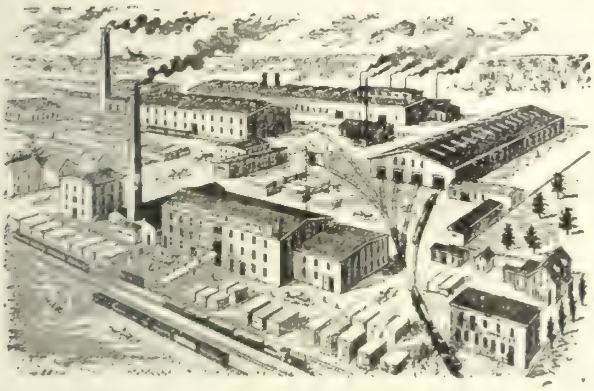

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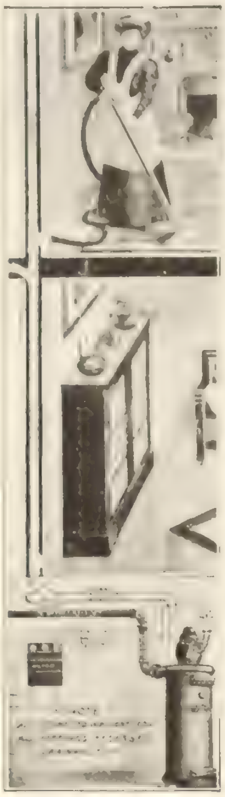

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4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
[illegible]	[illegible]
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

[illegible]

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

[illegible]

[illegible] in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
[illegible]	[illegible]	[illegible]
41 to 50 "	5 10	7 50
[illegible]	[illegible]	[illegible]
61 to 70 "	5 75	9 75
[illegible]	[illegible]	11 00
[illegible]	[illegible]	12 50
[illegible]		15 00
91 to 95 "		17 50
[illegible]		[illegible]
[illegible]		24 00
[illegible]		27 50

The following are wholesale prices for glass [illegible]

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
70	4 35	7 00
80	4 85	7 50
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
95		10 75
100		[illegible]

[illegible]

WINNIPEG

	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
81 85		10 00
86 90		11 00
[illegible]		[illegible]
96 100		16 00

[illegible]

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.30; 1-inch, $1.35; ⅜-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.30 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, [illegible]

MCMYLER DERRICKS FOR SALE

[illegible] buckets, [illegible]ing engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turn over buckets, two (2) marine engines, boilers, [illegible]

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The
Laurentian Granite Co.
Limited
MANUFACTURERS OF
Building Granite, Granite Setts, Curbing, Crushed Granite

Samples Furnished and Prices Quoted on Application

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Bank of Ottawa Bld'g.
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Cement Sidewalk Tools

Send for Our 1912 Catalog.

We manufacture and carry in stock the largest and most satisfactory line of cement sidewalk tools in Canada.

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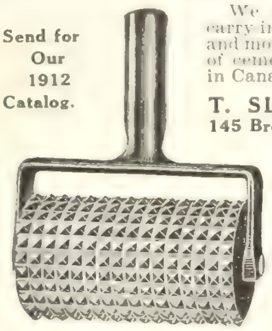

A Chance to Save on Sidewalk Tools

"Abram" Sidewalk Tools have no competitors they are the original and only automatic "Wrist Motion" long handled tools. Write at once for our special December discount offer, and catalog free. Every set sold with a guarantee

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20 YEARS' EXPERIENCE IN CANADIAN OIL FIELD

Contracts taken in any part of Canada. Several years experience in Artesian Wells for Municipal Water Works. Estimates or geological information cheerfully furnished.

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Shears
and Drills

Among our recent designs is the Bar Cutter No. 10 for cutting concrete reinforced bars—twisted, round or any other shape. It cuts bars up to 1¼" thick and, due to its steel frame, its **weight is only half** that of a cast iron machine of the same capacity. Ask for catalog of Steel Punches, Shears and Drills No. 145.

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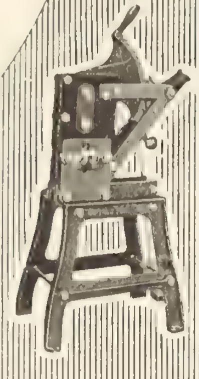
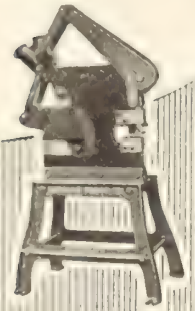
Toronto Vancouver





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"Built to Last"

is the slogan of our **1912 Rivet Forge.** The repair cost by this design is guaranteed to be actually **cut in two,** compared with any other forge now in the market. A bridge company using a large number of forges writes us regarding it: "The operator claims it runs easier and heats more rivets in less time than any forge he has ever used." Let us send you one on free trial. Fifty other styles, for light and heavy work.

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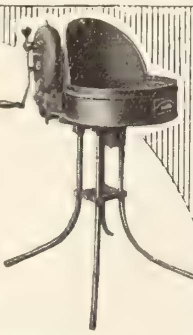
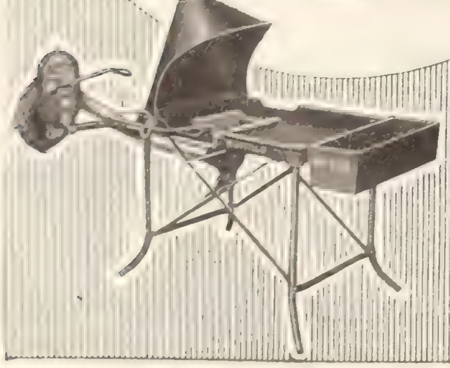
St. John Winnipeg
Toronto Vancouver





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WATER-PROOFING

We can provide specifications in this field based upon the use of our standard materials which will give you results based upon efficiency and REAL ECONOMY.

Dehydratine No. 1—A damp-proofing agent applied to inner walls—a furring substitute.

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Minerva Irish Felt—Considered by Engineers the best waterproofing medium in foundation work where pressures are to be met.

"The Dehydratines possess elasticity and durability which insure their permanence in the structure"

Hydratite—An inert substance for water-proofing concrete, stucco, etc.

Symentrex—A water-proof cement coating made in colors, for all exterior masonry surfaces and concrete floors.

Symentrin—"A near relative" to Symentrex, for interior plastered surfaces.

Bondsit—Bonds new to old concrete.

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For Every Lifting Purpose

"The Jacks that Duff Builds" are designed to give perfect satisfaction, and are noted for their durability, reliability, and easy, convenient operation.

Genuine BARRETT Track Jacks
Genuine BARRETT Automatic Lowering Jacks
DUFF Ball-Bearing Screw Jacks
DUFF-BETHLEHEM Forged Steel Hydraulic Jacks

Capacities from 1,500 lbs. to 500 tons and a wide variety of styles and heights, insures the selection of the proper jack for any requirement.

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CALGARY SASKATOON VANCOUVER VICTORIA

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RUBBER COVERED TRADE ADANAC MARK WIRES AND CABLES

Are made according to the specifications of the National Board of Fire Underwriters. The conductors are drawn from copper of the highest conductivity and are covered with two thicknesses of thoroughly vulcanized rubber compound of high quality. The wires are braided over insulation and the smooth high finish they receive makes them specially desirable for conduit work.

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TORONTO REGINA WINNIPEG
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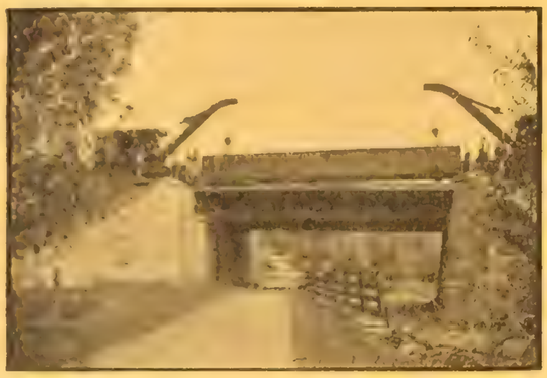

Wrecking, Locomotive and Coaling Cranes

In Capacities of from Five to One Hundred Tons

For use about

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"Industrial Works" Cranes embody all those features of practical utility which make for the economical solution of lifting and handling problems in the modern industrial plant. From the very smallest to the largest, their lifting capacity, integral strength, rigidity and speed have been proven by actual service tests all over the country.

If interested in Cranes—ask for our catalogue

F. H. Hopkins & Co.

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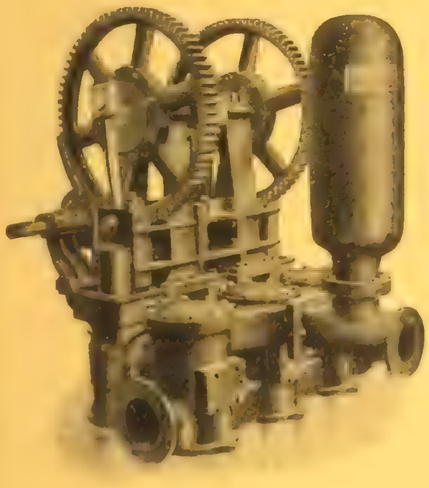
Contract Record and Engineering Review



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Made in all Kinds of Glass on Short Notice

Large Bent Plate Glass for Shop Fronts a Specialty

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"ELECTRIC AIR" ROCK DRILLS
CAMERON PUMPS

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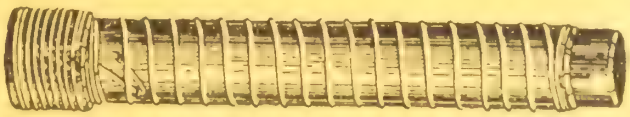

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RESERVOIR TANKS

for city and town Water Systems, Fire Protection, Power Plants, Hydraulic Mining, Irrigation, etc. One-half the cost of Iron Pipe—and better.

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Office and Factory, Granville St., near High Bridge
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Full Particulars and Estimates Furnished

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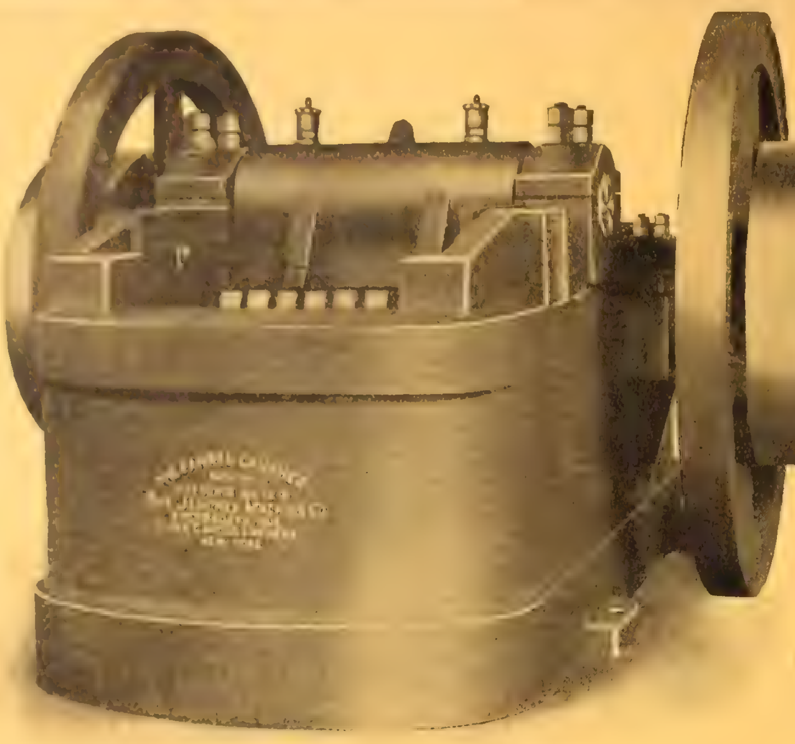

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Many Years Experience and Exceptional Facilities

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Loaded with DOLLARS is assured to all users of

"American" Derricks

which meet the three principal requirements of modern construction work

Reliability—Rapidity—Economy

There isn't a day that we don't help some contractor to success. Mav we help you today?

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Canada-wide Distribution!

When you, Mr. Engineer, plan a building—or when you Mr. Contractor, erect it—you are usually anxious to get it completed as soon as possible.

Delay in completion is certain to cause complaints and confusion—and is likely to cause financial loss.

Therefore, in selecting materials, it is to your advantage to specify the Cement made by the Company best equipped to supply your requirements quickly, for thus you reduce the danger of delayed delivery. The Canada Cement Company's mills—located at Exshaw, Calgary, Winnipeg, Port Colborne, Shallow Lake, Belleville, Marlbank, Lakefield, Hull and Montreal—are so placed as to provide the quickest possible delivery to any point in Canada.

WE HAVE CANADA-WIDE DISTRIBUTION

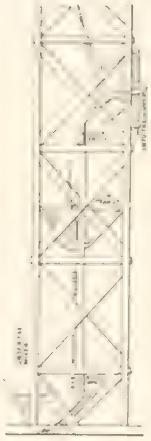
Quick delivery is an important point. Complete delivery of your whole order is even more important. Canada Cement mills have sufficient capacity to completely fill all orders promptly.

Write for "Factories and Warehouses of Concrete."
It will interest you. Enclose 12 cents in stamps for postage.

Canada Cement Company
Limited
No. 62 Herald Building - MONTREAL
Sales Offices: TORONTO - WINNIPEG - CALGARY

Economy

The Insley System of handling concrete is the most complete labor saving as well as the simplest equipment on the market to-day.



With the Insley Concrete Spouting Plant, concrete may be distributed over large areas at a small cost.

Insley Clamps are Universal

Adjustable Column Form Clamps

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The Up-to-date Equipment

This outfit as illustrated
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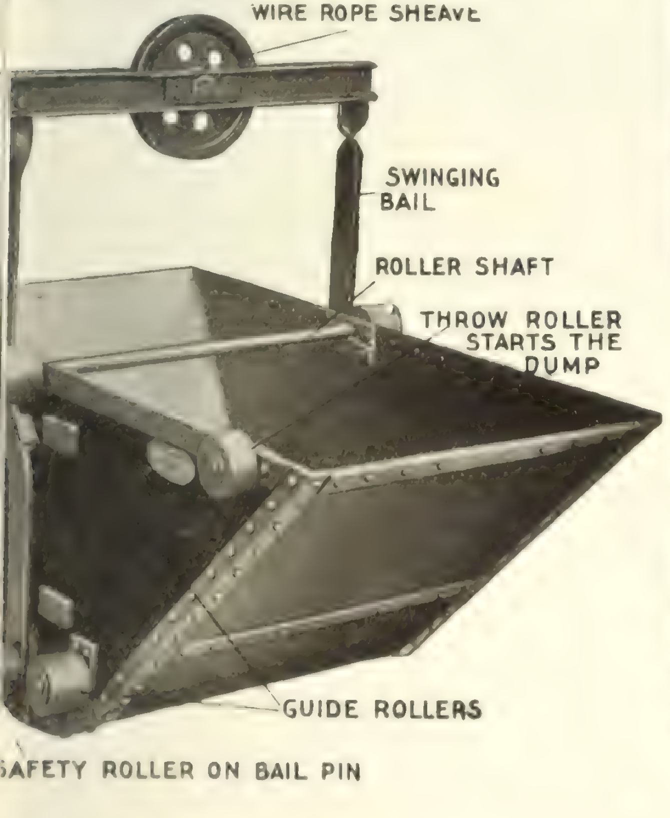

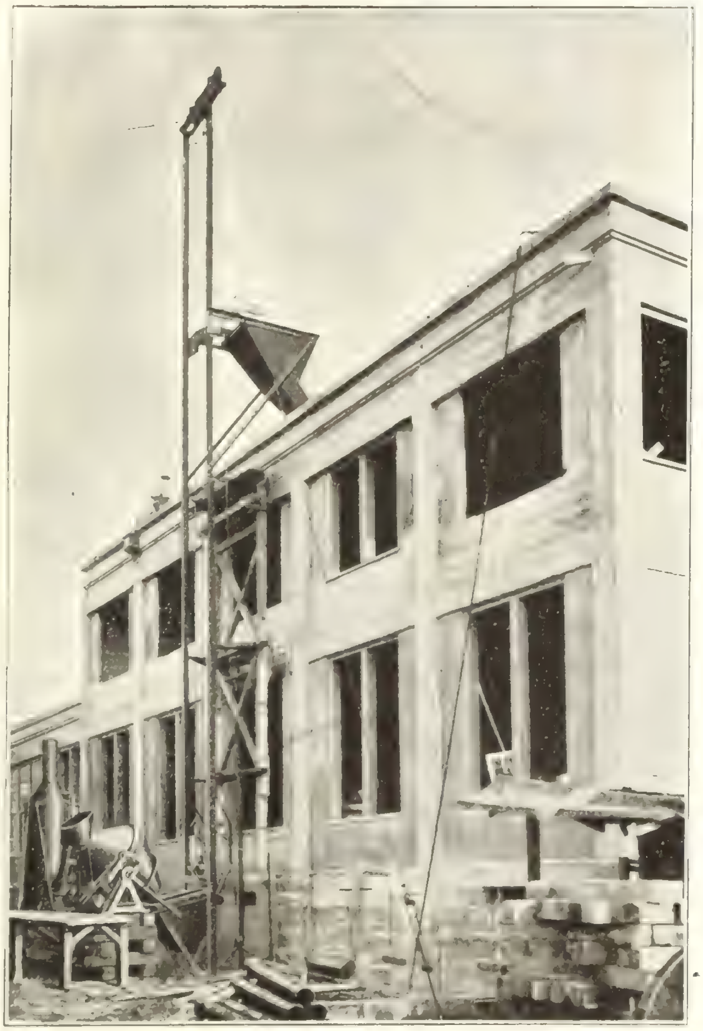

It is the quickest, most complete and efficient combination on the market.

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PORTABLE BOOM DERRICKS,
SKIPS, SPREADER CARTS,
Etc., Etc.**

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Beckman Co., L.
Buff & Buff Mfg. Co.
Eaton Company, T.
Gurley, W. & L. E.
Watts & Son, E. R.

Filler, Floor and Sewer Joint
Asphalt
Canadian Mineral Rubber Co.

Filters
American Water Softener Co.

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Bell Filtration Co.

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Improved Equipment Co.
Ontario Lime Association
Smyth & Ryan

Fireproof Doors and Windows
Dahlstrom Mettalic Door Co.
Mussens Limited
Ormsby, A. B.
Steel & Radiation Ltd.

Fuse (Safety Blasting)
Lecky & Collis

Forges
Canadian Buffalo Forge Co.

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Improved Equipment Co.

Gas Plants Complete
Improved Equipment Co.

Gas Producers for Heating
Improved Equipment Co.

Gas Machinery
Improved Equipment Co.

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Briscall, William
Consolidated Glass Co.
Hamilton Art Glass Co.
Hobbs Mfg. Co.
Luxfer Prism Co.
Thompson, B. & S. H.
Toronto Plate Glass Imp't'g Co

Hammer Drills
Canadian Ingersoll-Rand Co.

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Canadian Buffalo Forge Co.
Sheldons Limited
Jenckes Machine Co.

High Pressure Pipe Lines
Canadian Boving Co.
Escher Wyss & Co.

Hoisting Apparatus
American Hoist & Derrick Co.
Bates & Edmonds
Beatty & Sons, M.
Browning Engineering Co.
Canadian Fairbanks-Morse Co.
Canadian Ingersoll-Rand Co.
Doty Marine Engine & Boiler Co
Erie Clutch & Pulley Co.
Factory Products
Inglis, John
Jenckes Machine Co.
Hopkins & Co., F. H.
Lecky & Collis
Marsh & Henthorn
Mussens Limited
Royce Limited
Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
Canadian Fairbanks-Morse Co.

Horse Stable Fittings
Beatty Bros.

Hydrants
Canada Iron Corporation
Gartshore-Thomson Pipe Co.
Kerr Engine Co.

(Continued on page 12)

Don Valley Products

New Residence for Lieutenant Governor of Ontario, Toronto. Provincial Architect Heakes, Architect.
Don Valley Brick and Porous Terra Cotta used throughout.

Don Valley Bricks

are used in the construction of the most important public buildings erected by the Provincial Government. They are specified by the leading architects for every building of importance. The latest example of the public recognition of their superiority is found in their use for the new Toronto Residence of the Lieutenant Governor of Ontario. Don Valley Bricks possess a beauty of color and an even texture and form which add that touch of distinction to a building that characterises it as fulfilling the essentials of decorative dignity.

Don Valley Hollow Tile Fireproofing is absolutely dependable for that structural strength necessary to resist the action of age or any other deteriorating influence. For many years its success as a staple and fireproof building material has been established in hundreds of practical tests in buildings throughout the country.

"SPECIFY DON VALLEY PRODUCTS"

THE DON VALLEY BRICK WORKS

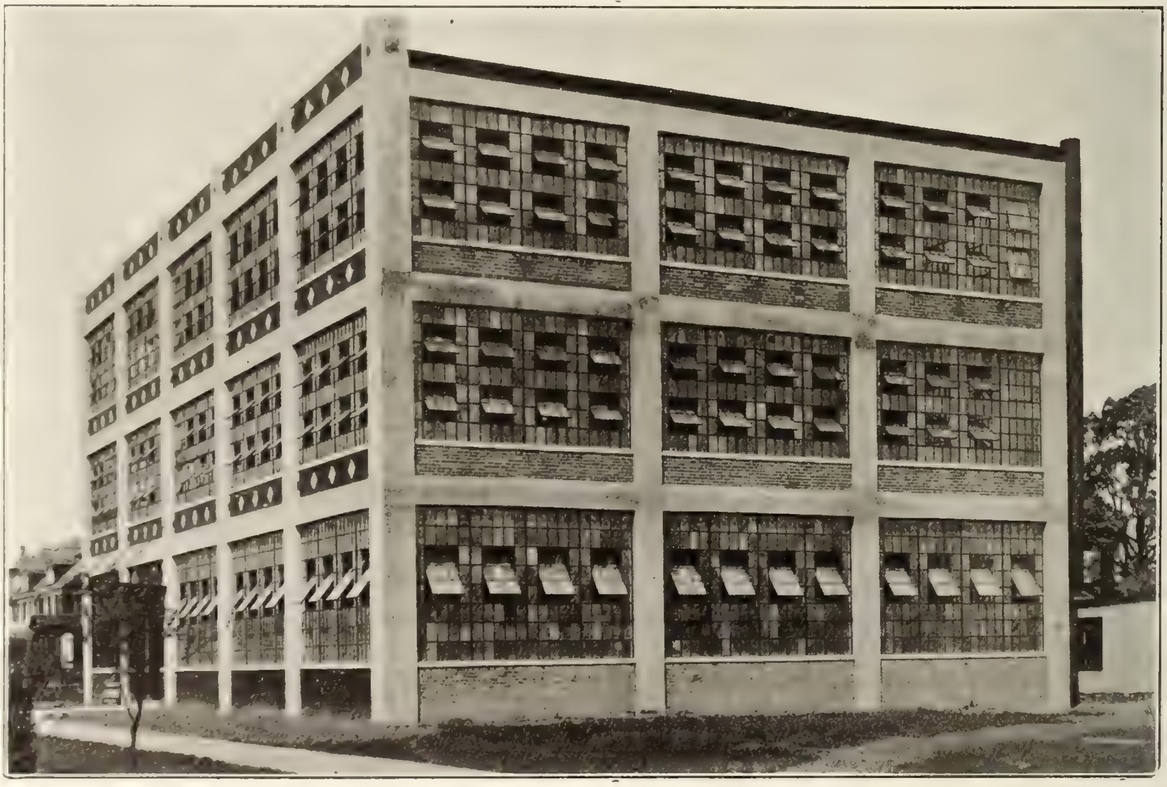
Head Office: 36 Toronto St., TORONTO
Montreal Agent: **David McGill, 83 Bleury Street**

LIGHT + VENTILATION = PROFITS

FENESTRA SOLID STEEL WINDOWS will provide your factory with an abundance of pure air; and light practically as good as that "out doors." Your employees will be able to do more and better work.

FENESTRA STEEL SASH not only increases production, but also reduces costs. Window upkeep expenses and artificial lighting bills are reduced almost to the vanishing point.

FENESTRA SASH is inexpensive compared with wooden sash, which is short lived and inflammable. It affords the minimum obstruction to light. It is attractive in appearance, strong and durable. Made to meet all conditions and sizes of window openings.



One of many buildings in Canada equipped throughout with "FENESTRA."

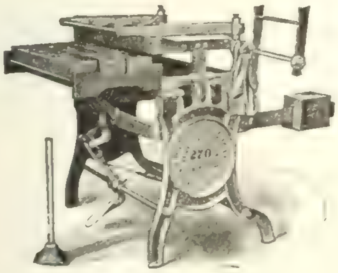
WRITE TO-DAY FOR CATALOG describing fully the merits of steel sash for all types of industrial buildings, large or small. FENESTRA has no equal for windows for foundries, power houses, factories, public buildings, machine shops, draughting rooms, railroad shops or any other buildings where the maximum light and ventilation are desired.

STEEL AND RADIATION, LIMITED

TORONTO, CANADA

CONCRETE MACHINERY

For all classes of work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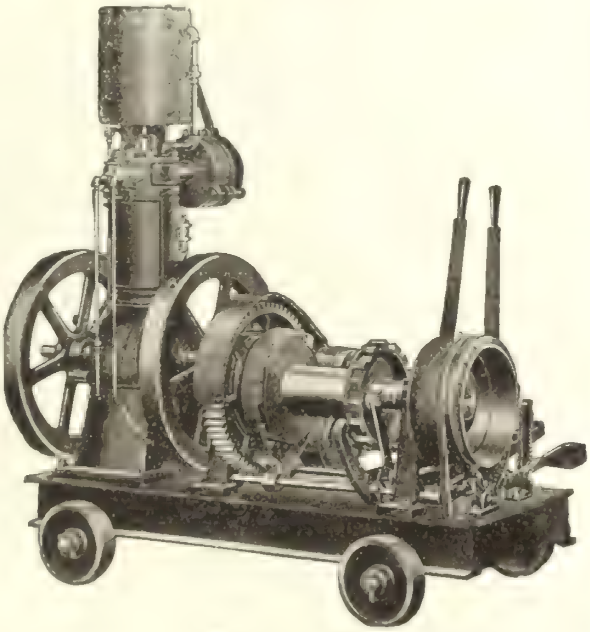
Lawn Vases

We are the only large manufacturers in Canada who specialize.

That is why we are able to supply the contractor with his every requirement in Machinery for the working of Concrete. Nothing counts like THE PRODUCTION ON A LARGE SCALE.

CONTRACTOR
TELL US YOUR
REQUIREMENTS

ASK FOR 1912
CATALOGUE

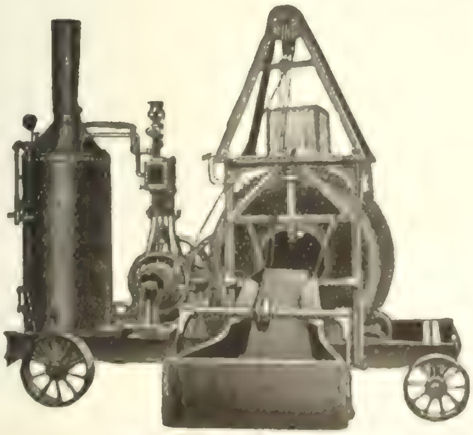

Builder's Double Acting Hoist

THE LONDON MACHINES are doing ALL WE CLAIM for them.

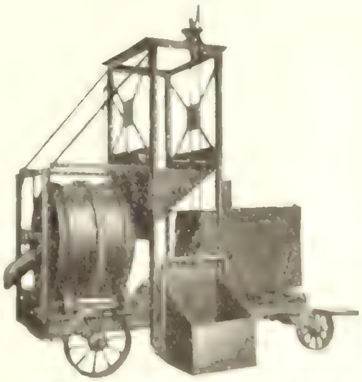
While we are BUILDING MACHINES we are BUILDING our REPUTATION.

THE ENORMOUS SALE of OUR MACHINES is sufficient proof to us that it pays to build machines of the VERY BEST TYPE.

The CHEAP article we do not make.


Standard Drum Batch Mixer

We manufacture a full line of CONCRETE MACHINERY and Cement WORKING TOOLS, also CONTRACTORS' MACHINERY and EQUIPMENT.


Paving Machine with Side Loader

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
TORONTO (60 Richmond St. W. F. D. Emsley, Mgr.
HALIFAX, 106 Pleasant St. G. B. Oland, Mgr.

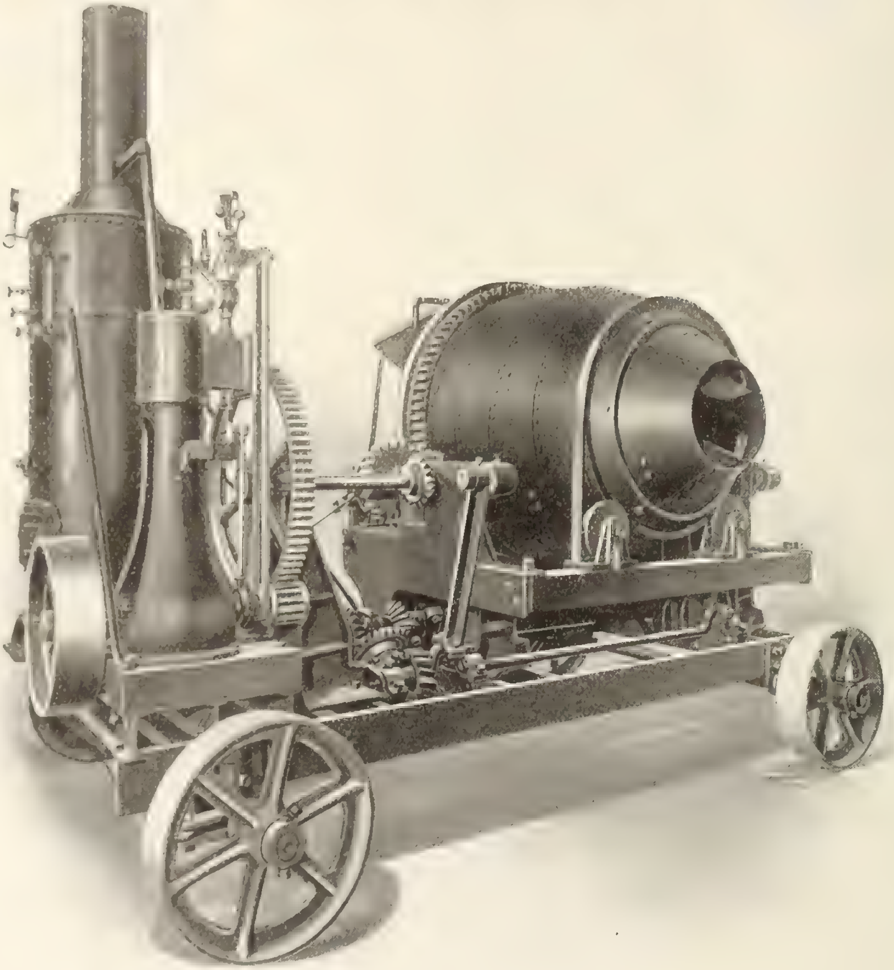
AGENCIES:

VANCOUVER, B. C. Equipment Co.,
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng & Supply Co
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

The WETTLAUFER

FAMOUS HEARTSHAPE MIXER

Automatic Operation Throughout



Steel and Semi-Steel Castings

will give you the

BEST RESULTS

Will save you Time, Money and Labor = Dollars and Dollars to you.

Send for Catalogue and full particulars and come and see it working any time at

WETTLAUFER BROTHERS

TORONTO

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AGENCIES :

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15 Dock St., St. John, N. B.

Lavallee Ross, Limited
Alexandra Block, Howard Ave.
Edmonton, Alta.

Hooton & Moore
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MONTREAL OFFICE and WAREROOMS : **316 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave**

For Your Next Shipment of Cement, Order

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

ROGERS

Portland Cement

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at

Kirkfield - Owen Sound - Hanover - Orangeville - St. Mary's

Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone—but cheaper.

"Steelcrete"

The perfect system of concrete reinforcement.

Full particulars on request orders filled from stock.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

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Toronto, Ontario

Western Sales Manager
W. J. DINNEN & CO., Winnipeg, Man.

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  Linde British Refrigeration Co.

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Insulating Compounds
  Canadian Mineral Rubber Co.
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  Batts Limited
  Canada Office & School Fur. Co.
  Oshawa Int. Fittings Co.
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  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

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  Christie, Henderson & Co.
  Jamieson Lime Co.
  Ontario Lime Association

Lime Kilns
  Improved Equipment Co.

Locomotives
  Canadian Boving Co.
  Montreal Locomotive Works
  Canada Foundry Co.

Marble
  Dominion Marble Co.
  Lautz Company
  Missisquoi Marble Co.

Metal Lath
  Greening Wire Co., B.
  Metallic Roofing Co.
  Noble, C. W.
  Steel & Radiation Ltd.

Metal Forms
  Hotchkiss Lock Metal Form Co.

Meters, Water
  Hopkins & Co., F. H.
  McDougall Caledonian Iron Wks
  Neptune Meter Co.
  Union Water Meter Co.

Packing and Pipe Coverings
  Garlock Packing Co.

Paints (Bridge and Structural Iron and Pipe Coating)
  Canadian Mineral Rubber Co.

Paints and Varnishes
  Billings Chapin Co.
  Elaterite Paint Co.
  Pinchin, Johnson & Co.
  R.I.W. Damp Resisting Paint Co.

Paving Cement
  Canadian Mineral Rubber Co.

Paving and Paving Materials
  Dominion Creosoting Company
  Metropolitan Paving Brick Co.
  Ontario Asphalt Block Co.
  Paterson Mfg. Co.

Perforated Metals
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Pipe (Concrete, Iron and Wood)
  American Spiral Pipe Works
  Canadian Pipe Co.
  Dominion Concrete Co.
  Gartshore-Thomson Pipe Co.
  Munderloh & Co.
  National Iron Works
  National Pipe & Foundry Co.
  Pacific Coast Pipe Co.
  Piggott & Co., Thos.

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  American Hoist & Derrick Co.
  Browning Engineering Co.
  Canadian Ingersoll-Rand Co.
  Lecky & Collis
  Vulcan Iron Works

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  Canadian Buffalo Forge Co.
  Sheldons Limited

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  Alabastine Co.
  Albert Mfg. Co.
  Britnell & Co.
  Crown Gypsum Company

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Plumbers' Supplies
  Standard Ideal Co.

Pneumatic Machinery
  Canadian Ingersoll-Rand Co.

Portable Saws
  Canadian Fairbanks-Morse Co.

Portable Track
  Bechtels Limited

Power Engines
  Inglis Company, John

Pumps and Pumping Machinery
  Bates & Edmonds
  Beatty & Sons, M.
  Canada Foundry Co.
  Canadian Boving Co.
  Canadian Buffalo Forge Co.
  Canadian Fairbanks-Morse Co.
  Canadian Ingersoll-Rand Co.
  Cook, A. D.
  Escher Wyss & Co.
  General Supply Co.
  Hamilton Mfg. Co., Wm.
  Hopkins & Co., F. H.
  Inglis & Co., John
  McDougall Caledonian Iron Wks.
  Smart-Turner Machine Co.
  Thomas & Smith
  Waterous Engine Works Co.
  Mussens Limited
  Ontario Wind Eng. & Pump Co.

Quarry Machinery
  Canadian Ingersoll-Rand Co.
  Improved Equipment Co.
  Lecky & Collis
  George Anderson & Co.

Railway Supplies
  Gartshore, John J.
  Hopkins & Co., F. H.
  Mussens Limited

Refrigeration Machinery
  Linde British Refrigeration Co.

Reinforcements, Concrete & Steel
  Ambursen Hydraulic Cons. Co.
  Canada Steel Co., Ltd.
  Canada Wire & Iron Goods Co.
  Factory Products
  Greening Wire Co., B.
  Leach Contracting Co.
  Steel Co. of Canada
  Steel & Radiation Ltd.
  Trussed Concrete Steel Co.
  Turner, C. A. P.

Revolving Stone Screens
  Greening Wire Co., B.

Road Asphalt
  Canadian Mineral Rubber Co.

Road Machinery
  Erie Machine Shops
  Huber Manufacturing Co.
  Lecky & Collis
  Morrison & Co., T. A.
  Mussens Limited
  Waterous Engine Works Co.
  Western Wheeled Scraper Co.

Roofing Material
  Asbestos Mfg. Co.
  Brantford Roofing Co.
  Can. H. W. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Canadian Supply Company
  Metallic Roofing Co.
  Noble, Clarence W.
  Paterson Mfg. Co.

(Continued on page 14)

The

Doty Marine Engine & Boiler

Company Limited

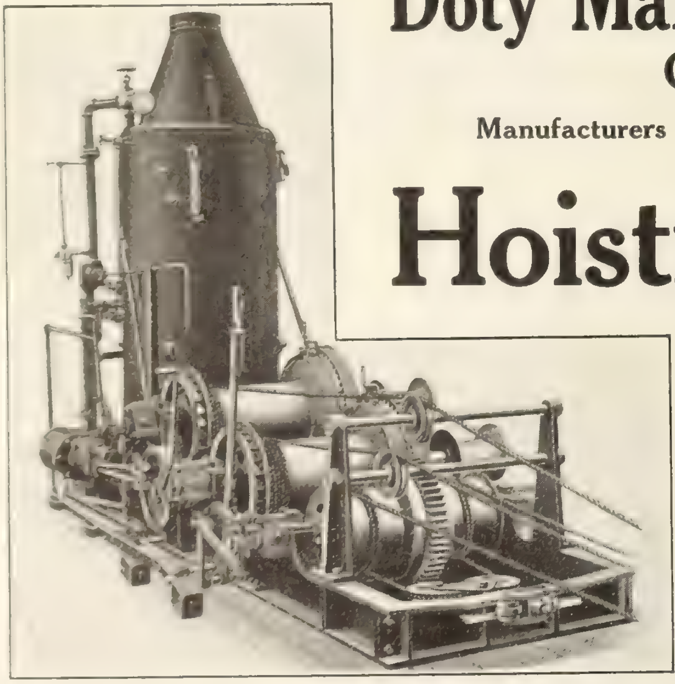
Manufacturers of **Superior**

Hoisting Engines

Derrick Swingers, Material Elevators, etc.

for

Contractors, Mines and Quarrymen



This cut illustrates our Standard Double Cylinder Double Drum Hoisting Engine with Derrick Swinger attached. "Superior to any other on the market." All parts constructed, guages and templates and every engine tested under steam.

A full line of Hoisting Engines, with Boilers to pass inspection in any province, kept in stock by The Doty Engine Works Co., Winnipeg, Man., and also at our

Works—GODERICH, ONT.

To buy our Engines is a Guarantee of Satisfaction

The Real Belt Test is Actual Service

You do not care what tests a belt will stand unless it stands up under one—actual service.

The Sawyer Canvas Belt stands the hardest service in Brick and Clay Plants

This is one of the many classes of work to which Sawyer is particularly adapted. Whether you want a main drive, or smaller drive, or a large elevator belt, the Sawyer will do the work.
Write for our book "Stunts," which shows how others utilize Sawyer Canvas Belts.

Sawyer Belting Co., Cleveland, O.

WESTERN DUMP CARS

can be dumped and righted by fewer men and in less time than required for the same operation on many other cars

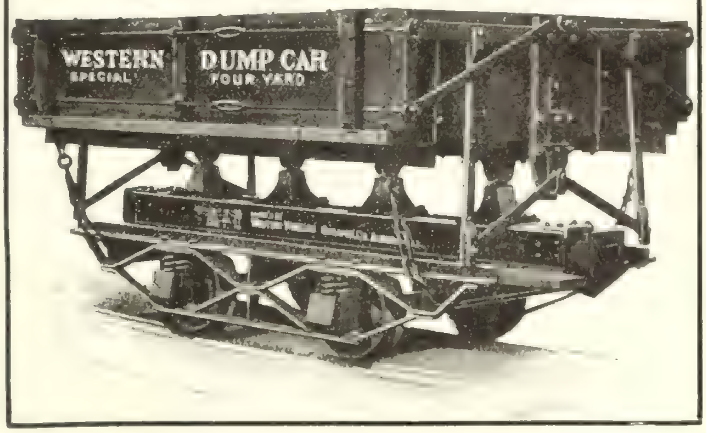
Prominent Contractors have made the above statement time and time again, and its a proven fact. Just think of the saving.

Western Air Dump Cars are used by many of the largest Railroads and at the Panama Canal.

There must be many reasons.

Let us tell you them.

WESTERN WHEELED SCRAPER CO.
AURORA, ILLINOIS
Earth and Stone Handling Machinery



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS	1903	$ 0.00	1908	$ 93.26
	1904	3.30	1909	200.46
	1905	9.35	1910	14.07
	1906	37.33	1911	2.29
	1907	16.11		

Total $376.17 or 5⅔c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.

Hagersville, Ont. **Limited**

CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

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  [illegible] & Rubber Co.

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  Taylor, J. & J.

Sand and Gravel
  National Sand and Material Co.
  Sand and Supplies Ltd.
  [illegible] Gravel Co.

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  Canada Wire & Iron Goods Co.
  Greening Wire Mfg. Co., B.

Sewer Joint Asphalt
  Canadian Mineral Rubber Co.

Sewer Pipe
  Britnell & Co
  Canada Iron Corporation
  Dominion Sewer Pipe Co.
  Gartshore Thomson Pipe Co.
  National Iron Works
  Ontario Sewer Pipe Co.
  Smyth & Ryan
  Standard Drain Pipe Co.

Sewer Trenching
  Austin Drainage Excavator Co.
  Lecky & Collis
  Mun. Engineering & Contracting Company

Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
  Browning Engineering Co.
  Beatty & Sons, M.
  Canada Foundry Co., F. H.
  Hopkins & Co., F. H.
  Montreal Locomotive Works
  Mussens Limited
  Thew Automatic Shovel Co.
  Willis Shaw Mach. Co.

Shovels
  [illegible] Shovel & Tool Co.

Smoke Stacks
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
  Cabot, Inc., Samuel
  Pinchin, Johnson & Co.

Steam Apparatus
  Canadian Buffalo Forge Co
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Steam Turbines
  McDougall Caledonian Iron Wks.

Steel
  Canada Steel Co., Ltd.
  Dominion Steel Castings Co.
  Lecky & Collis
  Provincial Steel Co.

Steel Bars
  Canada Steel Co., Ltd.
  Factory Products
  Steel Co. of Canada.
  Steel & Radiation, Ltd.

Stone
  Britnell & Co.
  Brodie, Jas.
  Christie, Henderson & Co.
  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
  Rogers Supply Co.
  Roman Stone Co.
  Sackville Freestone Co.
  Sand & Supplies
  Smyth & Ryan

Stone Saws
  Anderson, Geo.

Structural Iron and Steel
  Canada Steel Co.
  DesMoines Bridge Co.
  Dominion Bridge Co.
  Factory Products
  Dominion Steel Castings Co.
  Hamilton Bridge Works Co.
  Mackinnon Holmes & Co.
  McNeil & Co., W. P.
  Phoenix Bridge & Iron Works
  Provincial Steel Company
  Reid & Brown
  Sarnia Bridge Company
  Steel Co. of Canada
  Structural Steel Co.
  Standard Steel Construction Co

Submarine Drills
  Canadian Mineral Rubber Co.
  Lecky & Collis

Swinging Gears
  Dake Engine Company

Tanks and Stand Pipes
  Berg Machinery Co.
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.
  Inglis, John
  Jenckes Machine Co.
  Marsh & Henthorn
  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

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  Turner & Sons, J. J.
  Woods Limited
  Waterous Engine Works Co.

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  Gartshore-Thomson Pipe Co.
  Kerr Engine Co.

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  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Vacuum Cleaners
  Tuec Company

Varnishes—Insulating
  Standard Underground Cable Co. of Canada, Limited

Veterinary Remedies
  Johnson, A. H.

Waterproofing
  Billings Chapin Co.
  Cabot Inc., Samuel
  Can. H. M. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Ceresit Waterproofing Co.
  Chillas-Black
  Elaterite Paint Co.
  Pinchin, Johnson & Co.

Water Softeners and Filters
  American Water Softener

Water Turbines
  Canadian Boving Co.
  Escher Wyss & Co.
  Hamilton Mfg. Co., Wm.
  McDougall Caledonian Iron Wks.

Wire
  Canada Wire & Cable Co.
  Factory Products
  Standard Underground Cable Co. of Canada, Limited

Wires and Cables
  Royce Limited

Wire Guards and Screens
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Wire Rope
  Canada Wire & Cable Co.
  Greening Wire Co., B.
  Smith, Thos. & Wm.
  Steel Co. of Canada

Wood Turnings
  Automatic Wood Box & Turning Company

"PIONEER" ASPHALTS

"PIONEER" Highest Quality ASPHALTS
TRADE MARK

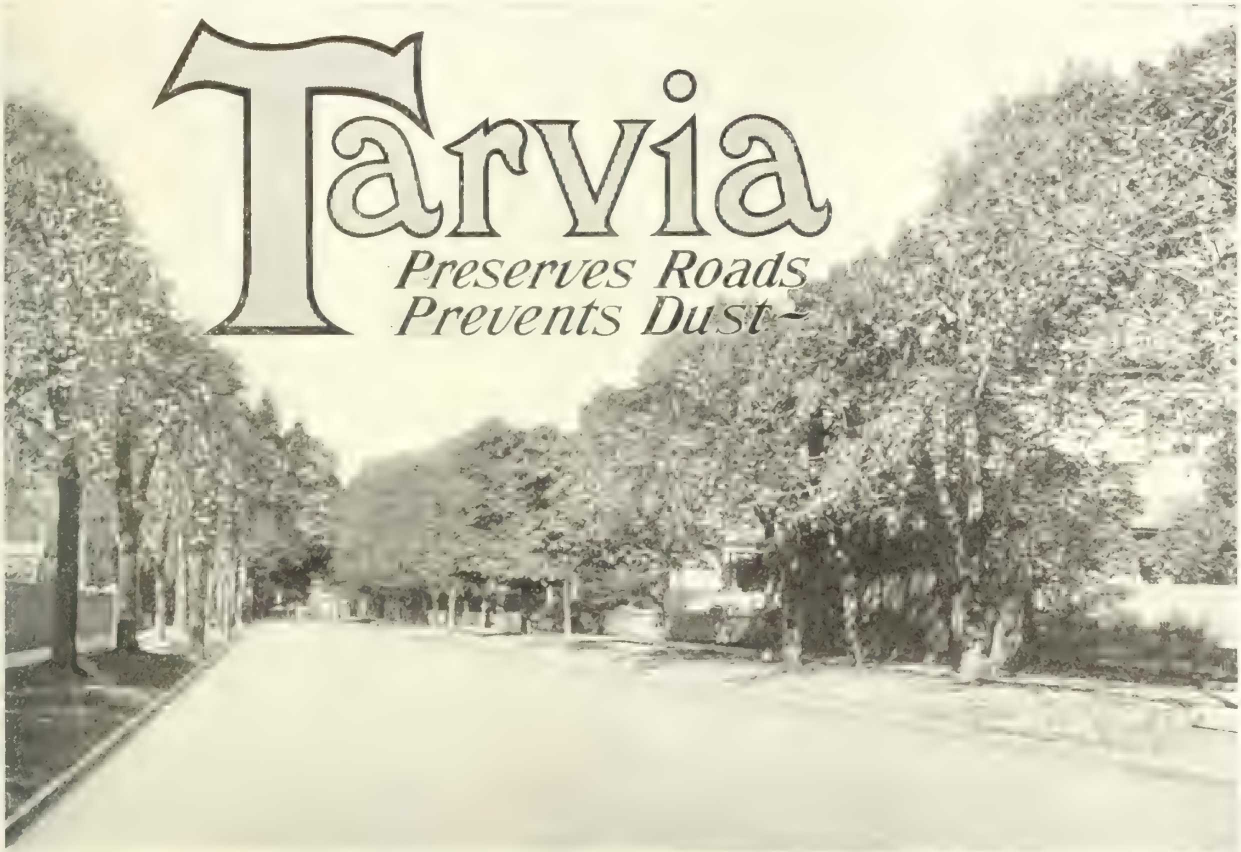
The 16 year record of "PIONEER" ASPHALTS is the best assurance an Engineer can have as to their efficiency, permanency and economy. Specify "PIONEER" ASPHALTS

For Asphalt Macadam Roads, Asphaltic Concrete, Sheet Asphalt Paving—and Filler for Brick and Block Pavements

and results will be highly satisfactory. "PIONEER" ASPHALTS are 99.5 per cent. pure bitumen. They are waterproof and weatherproof. Can be used for all purposes where an asphalt can be used.

Write for Specifications

THE CANADIAN MINERAL RUBBER CO., Ltd.
Canadian Express Building, MONTREAL **503 Canada Building, WINNIPEG**



ISABELLA STREET, TORONTO, ONT., TREATED WITH "TARVIA B"

Toronto's Experience with "Tarvia B."

Here is a street that was treated with Tarvia B in May, 1911, at the cost of 3 cents per yard. On July 28th, a second application was made at less expense. These two applications were sufficient to keep the surface in perfect condition throughout the year. In June, 1912, it was given an extra heavy application of Tarvia B, costing 3¼c. per yard, and stayed in good condition for the rest of the year. The surface has withstood practically the same cleaning as asphalt streets, being flushed with a pressure water wagon every week.

In the beginning the road was well worn macadam with an inclination toward ravelling in many cases.

Since the treatment began, it has been a well-bonded bitumen surface which retains its contour and smoothness with practically no cost for maintenance other than the Tarvia above mentioned.

Of all the bitumens proposed for road bonding purposes, Tarvia is the best because of its superior natural adhesive qualities. It forms a tough plastic matrix around the stone and prevents ravelling by traffic or torrents. Its cost is so low that in most cases it is actually cheaper to have a dustless road with Tarvia than a dusty road without it.

Booklets on request.

THE PATERSON MANUFACTURING COMPANY, LIMITED
MONTREAL TORONTO WINNIPEG VANCOUVER

THE CARRITTE-PATERSON MANUFACTURING CO., LIMITED
ST. JOHN, N.B. HALIFAX, N.S.

ALPHABETICAL LIST OF ADVERTISERS

[illegible] 85
[illegible] & [illegible]
[illegible] 80
[illegible] Company 21
[illegible] Cement Works 87
[illegible] Construction Company of Canada, Limited
[illegible] Brick & Tile Co. 92
[illegible] Hoist & Derrick Co. 2
[illegible] Pipe Works 23
[illegible] Water [illegible] Company
Anderson & Co., Limited, George 22
[illegible] Company
Armstrong, James C. 104
Asbestos Manufacturing Company 83
[illegible] & [illegible] 101
[illegible] Fire & [illegible] Co. 92

[illegible] R. D. 93
Batts Limited
[illegible]
Beatty & Sons, Limited, M. 34
Bechtels Limited
Bennett, Robert
Blystone Machinery Company 83
Bowman & Connor 104
Britnell & Company, Limited 98
Browning Engineering Company 74
Bremner, Limited, Alex. 103
Brown Hoisting Machinery Company 32
Brown Machine Company 98
Brodie & Company, James
Buff & Buff Manufacturing Company

Cabot, Incorporated, Samuel
[illegible] R. 104
Canada Cement Company 3
Canada Foundry Company, Limited 95
Canada Iron Corporation Limited 103
Canada Lifting Jack Company
Canada Steel Company 27
Canada Wire & Cable Company 27
Canada Wire & Iron Goods Co. 97
Canadian Boving Company 28
Canadian Bridge Company 100
Canadian Buffalo Forge Company 106
Canadian Fairbanks-Morse Co., Ltd. 107
Canadian H. W. Johns-Manville Co. 21
Canadian Kellogg Company
Canadian Mineral Rubber Company 14
Canadian Office School Furniture Co.
Canadian Pipe Company, Limited 19
Canadian Ingersoll-Rand Company 1-24
Ceresit Waterproofing Company 86
Chain Belt Company
Chipman & Power 104
Christie Henderson & Company 92
Clapham & Sons, John
Cleveland & Erie Machinery Company 85
Commercial, The
Conduits Company Limited 103
Consolidated Stone Company
Consolidated Plate Glass Company
Consumers Gas Company
Contractors' Supply Co., Ltd. 98
[illegible] D.
Corinthian Stone Company
Crown Gypsum Company
Crushed Stone Limited 91

Dake Engine Company 103
Dennis Wire & Iron Works Company 79
De-Moines Bridge & Iron Company 101
Dickson Bridge Works 85
Dominion Bridge Company 100
Dominion Concrete Company 76
[illegible] Company 78
Dominion Ornamental Iron Company
Dominion Marble Company 21
Dominion Sewer Pipe Company 20
Dominion Steel Castings Company 26
Dominion Wood Pipe Company 97
Don Valley Brick Works 7
Doty Marine Engine & Boiler Co. 12
[illegible] Company 38

Elaterite Paint Company
Engineering Works of Canada 81
Erie Machine Shops 85
Escher Wyss 99

Farmer, John T. 104
Ferguson, H. S. 104
Foundation Company 105
Fraser, E. M. 104
Fuce & Smith 104

Galt Engineering Company, John 104
Galt Stove & Furnace Company 76
Gardner & Saxby 104
Garlock Packing Company 89
Gartshore, John J. 104
Gartshore-Thompson Pipe & Foundry Co. 102
Gandry & Company, L. H. 80
General Supply Company 28
Goodyear Tire & Rubber Co. of Canada, Ltd. 35
Greening Wire Company, Limited, B.
Gurley, W. & L. 93

Hagersville Contracting Company 13
Hancock, Jr., H. Syd. 104
Hamilton Art Glass Co., Ltd.
Hamilton Bridge Co.
Hamilton Mfg. Company, Wm. 21
Hamilton Pressed Brick Company 90
Harvey, J. 85
Heinicke Company, H. R. 20
Hepburn, John T. 33
Hobbs Manufacturing Company
Hopkins & Company, F. H. 108
Hotchkiss Lock Metal Form Company 91
Hunt & Company Robert W. 104
Hynes, W. J.

Improved Equipment Company
Imperial Wire & Cable Company 107
Inglis Company, John 75
International Marine Signal Co. 18-92

Jamieson Lime Company 82
Jenckes Machine Company 2
Jennings & Ross 22
Johnson, A. H. 84
Jones & Glassco 36

Kennedy, James C. 104
Kerr Engine Company, Limited
Koehring Machine Company 82

Laurentian Granite Company 85
Laurie & Lamb 88
Lautz Company
Lea, R. S. 104
Lecky & Collis 17
Leonard & Sons, E. 91
Linde British Refrigeration Company
London Concrete Machinery Company 9
Lundy Shovel & Tool Company
Luxfer Prism Company

MacLean Daily Reports 96
Mahan & Company 84
Marsh & Henthorn, Limited 76
McDougall Caledonian Iron Works Co., John 77
McDowal, R. 104
McKinnon Holmes & Company 88
McMillan & Sons, W. 84
McNeil & Company, William P. 102
Meadows, George B. 37
Metallic Roofing Company 79
Metropolitan Paving Brick Co. 23
Miller & Company, Geo. M.
Mississquoi Marble Co., Ltd. 92
Mitchell Company, Limited, Robert 100
Montreal Locomotive Works Limited 91
Morrison & Company 104
Munderloh & Company, Limited
Mussens Limited 4
Myers, Oakley 91

Napanee Iron Works 17
National Bridge Company of Canada 101
National Iron Works Limited 103
National Pipe & Foundry Company 102
Neptune Meter Company 18
Noble, Clarence W. 79
Northwestern Terra Cotta Company 25

Ontario Asphalt Block Co., Ltd. 87
Ontario Sewer Pipe Company 20
Ontario Wind Engine & Pump Co. 91
Ormsby Limited, A. B. 37
Oshawa Interior Fittings Company
Owen Sound Iron Works

Pacific Coast Pipe Company 1
Paterson Manufacturing Company 15
Pedlar People 29
Phoenix Bridge Company 97
Piggott & Company, Thomas
Pinchin Johnson & Company 106
Power & Son
Provincial Steel Company 26

Queenstown Quarry Company 103

Reid & Brown 104
Rhodes Curry Company, Limited 83
"R.I.W." Damp Resisting Paint Co. 19
Rogers, Limited, Alfred 11
Roman Stone Company 30
Royce Limited 32

Sackville Freestone Company, Limited 34
Sand & Supplies Limited 102
Sarnia Bridge Company, Limited 101
Sawyer Belting Company 13
Sheldons Limited 18
Sheppard, James 89
Silcox, A. B.
Slack & Company, T. 85
Smart-Turner Machine Company 1
Smith, Limited, Thos. & Wm. 94
Smyth &Ryan 97
Standard Ideal Company 38
Standard Steel Construction Co. 101
Standard Underground Cable Co. of Canada. 81
Stanley Company, W. F.
Star Expansion Bolt Company
Steel Company of Canada 26
Steel & Radiation 8
Stinson-Reeb Builders' Supply Co.
Structural Steel Company 100
Sturtevant Co. of Canada, Ltd. B. F. 27

Taylor, J. & J.
Thew-Automatic Shovel Company 23
Toledo Wheelbarrow Company 84
Toronto Plate Glass Importing Co. 1-97
Toronto Iron Works 87
Trussed Concrete Steel Company 98
Tuec Company
Turner, C. A. P.

United States Steel Products Co. 31
United Typewriter 37
Urschel-Bates Valve Bag Company 84

Waterous Engine Works Company 97
Weeks, Arthur L. 104
Welch & Company, H. J. 104
Western Canada Contractor 98
Western Wheeled Scraper Company 13
Wettlaufer Bros. 10
Woodstock Wind Motor Company 99
Woods Limited 87
Wood and Service 104
Wooliscroft & Son, G 86

York Sand & Gravel Company 98

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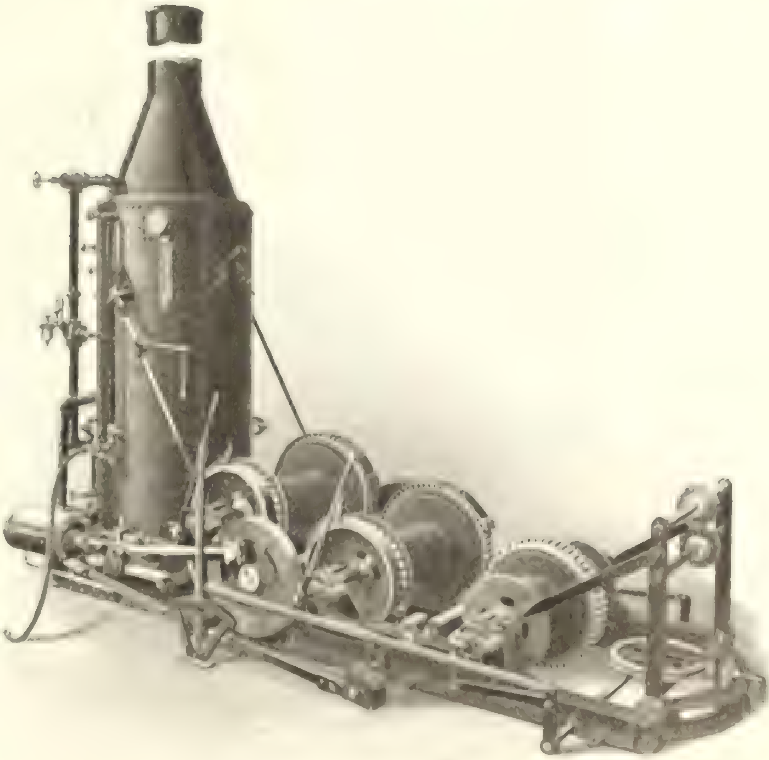

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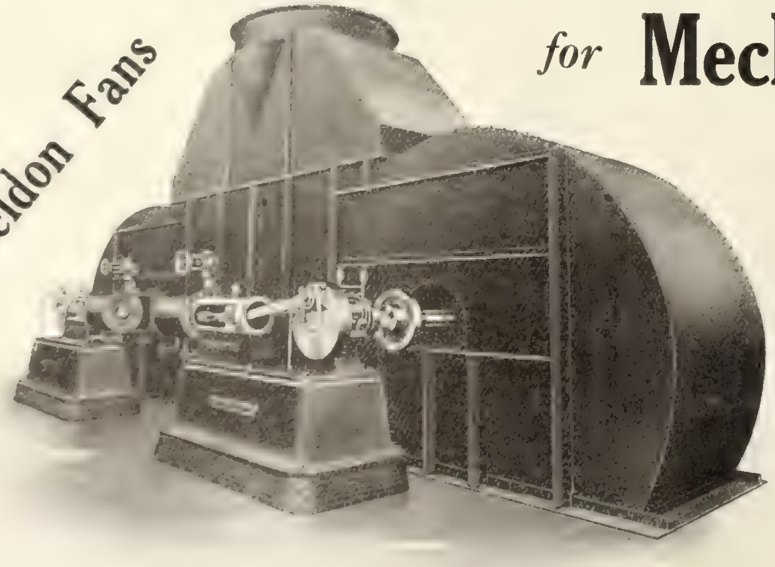

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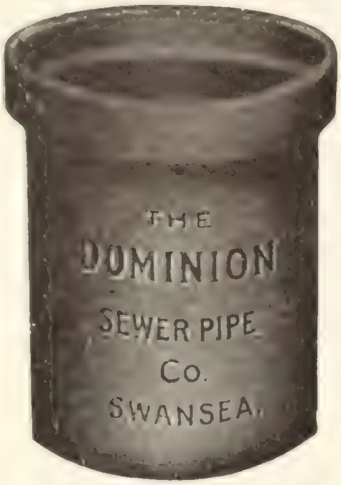

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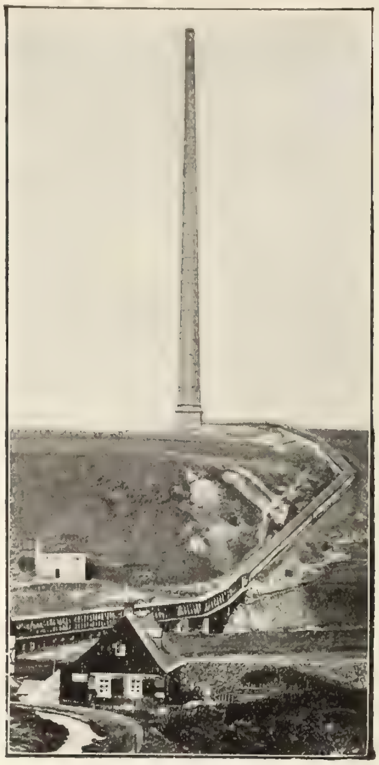

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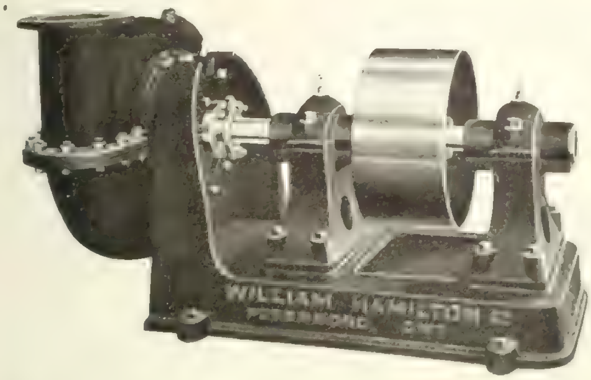

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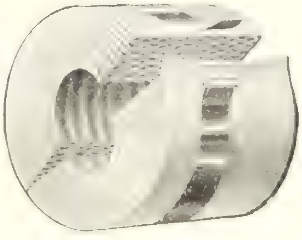

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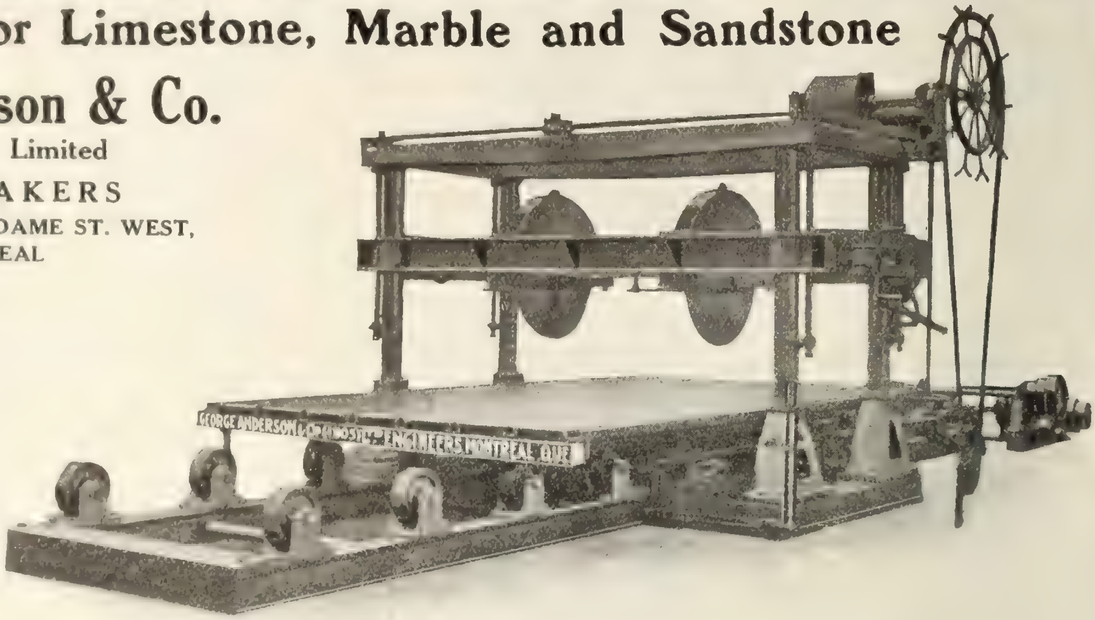
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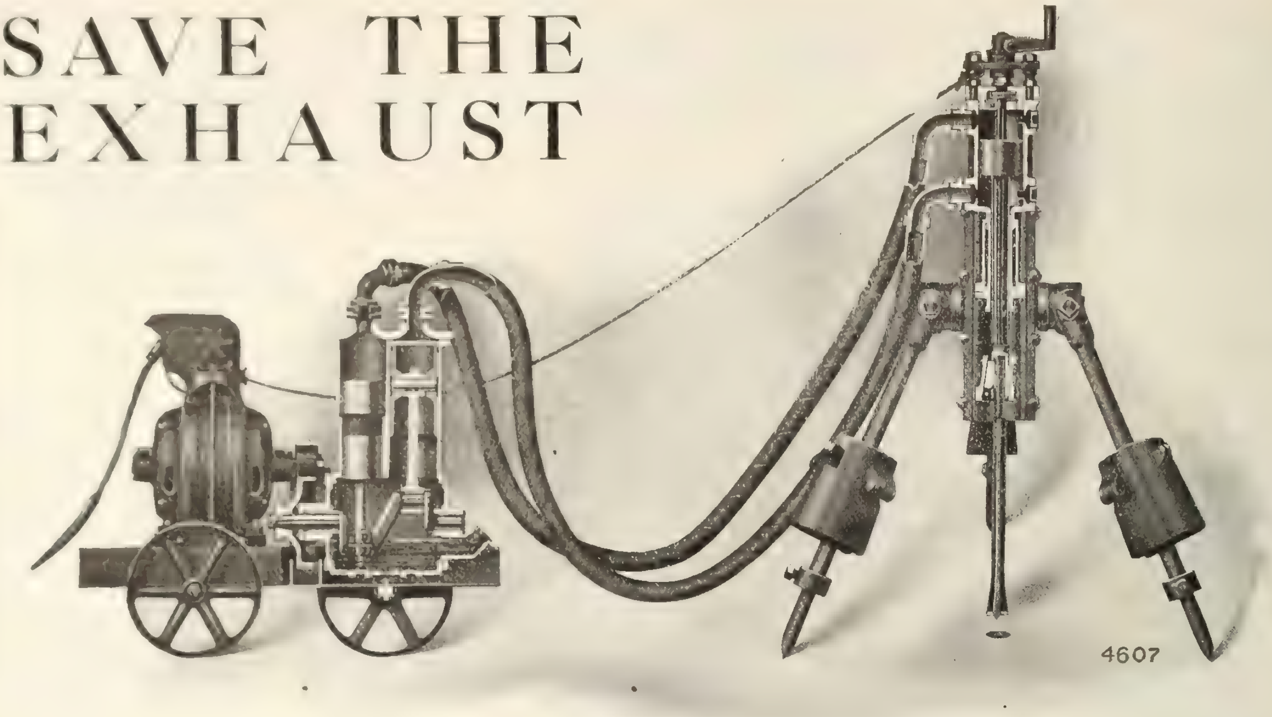

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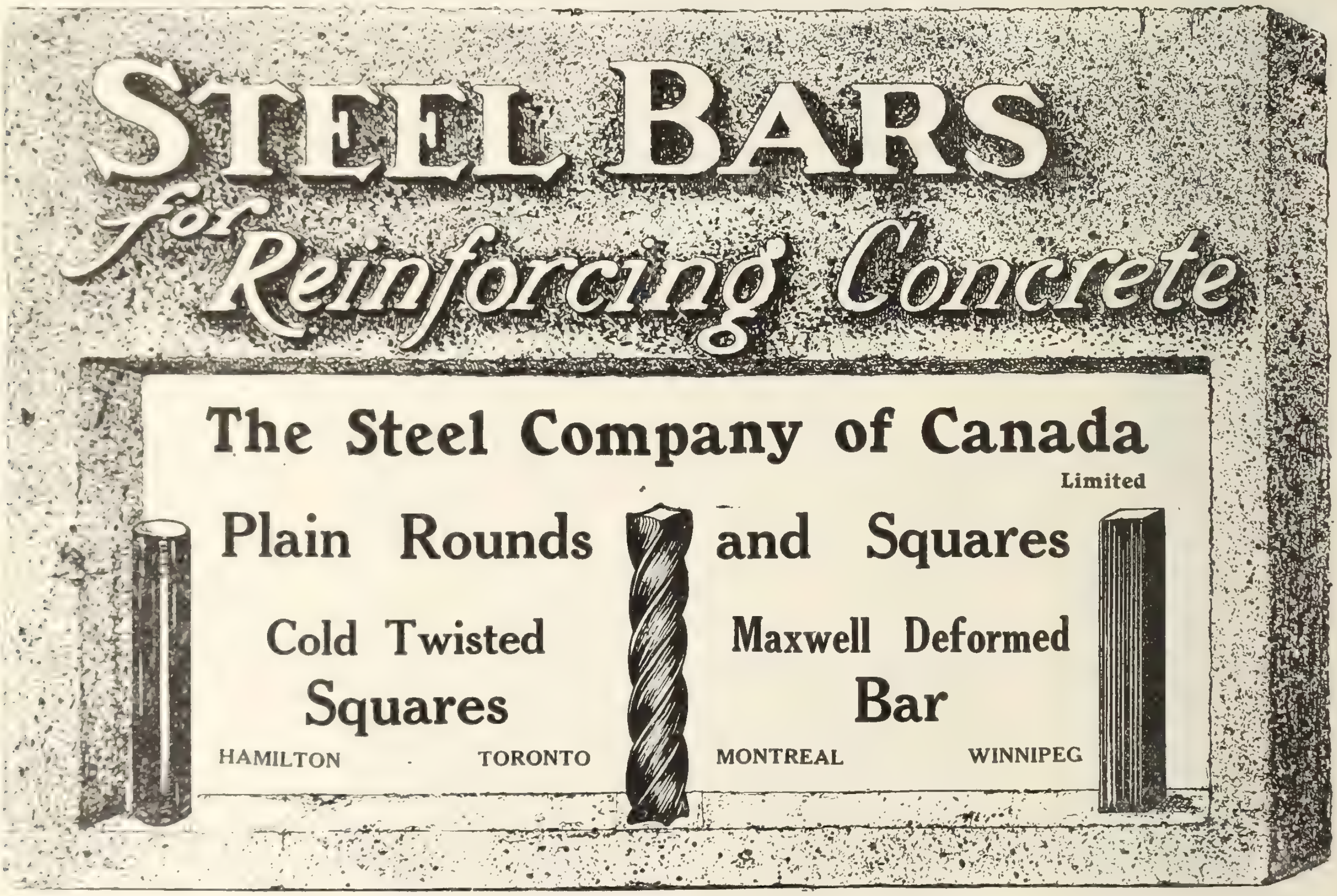

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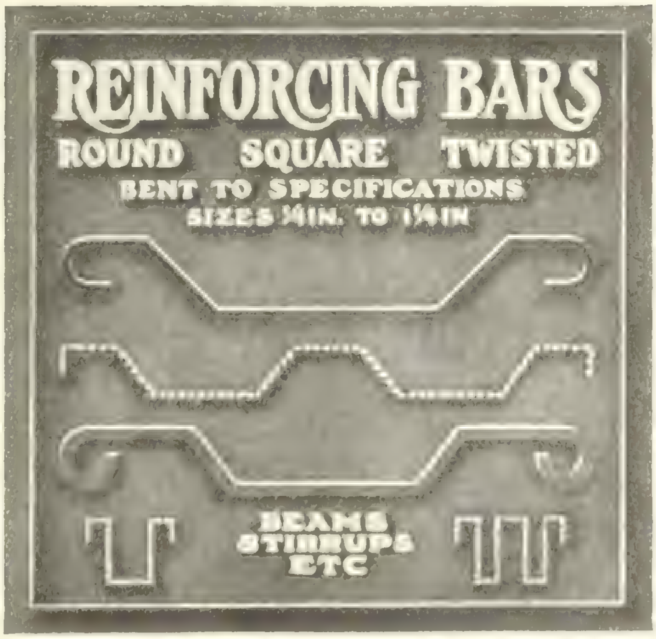

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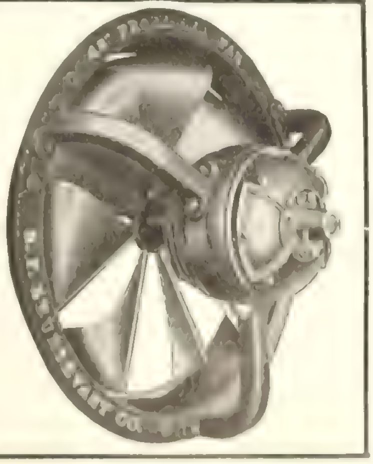

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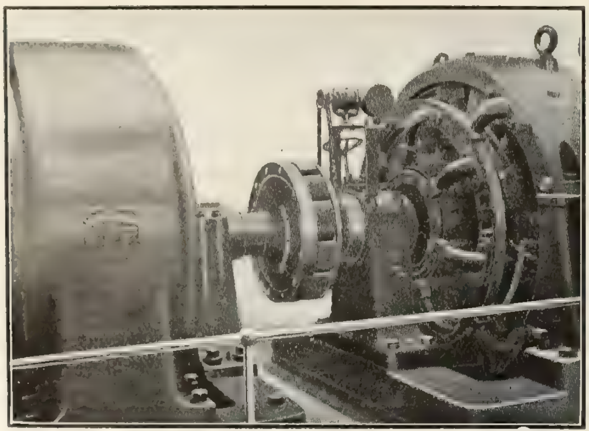

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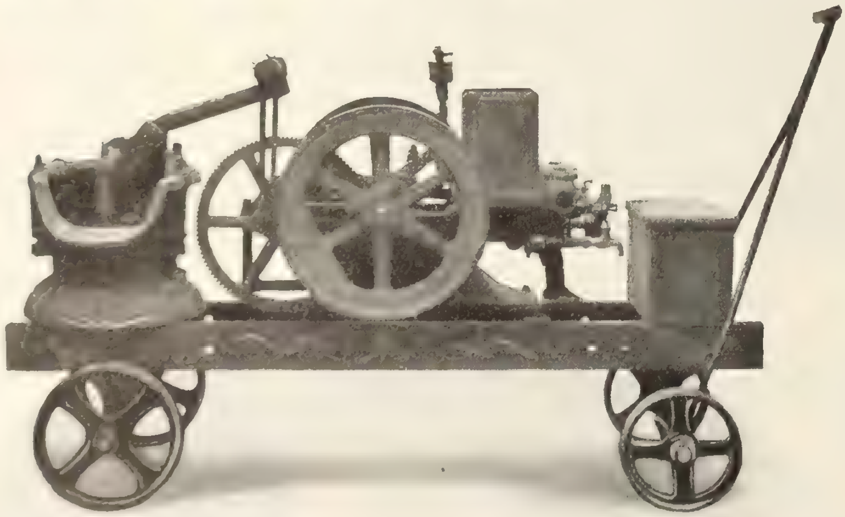

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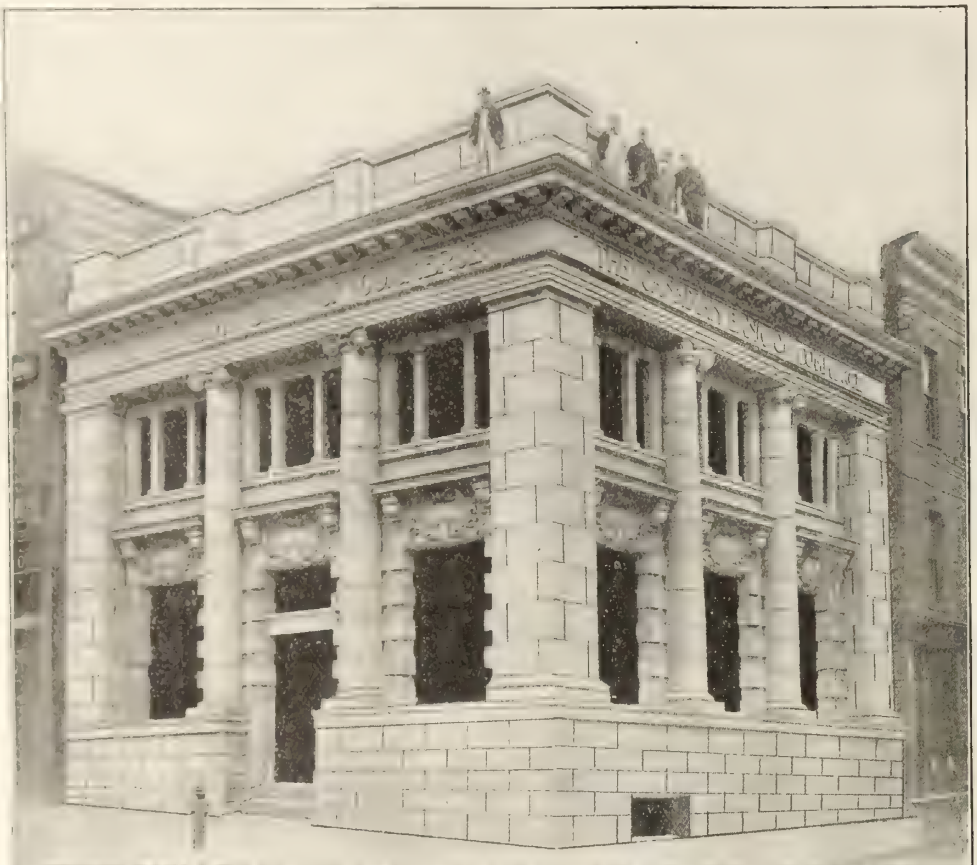

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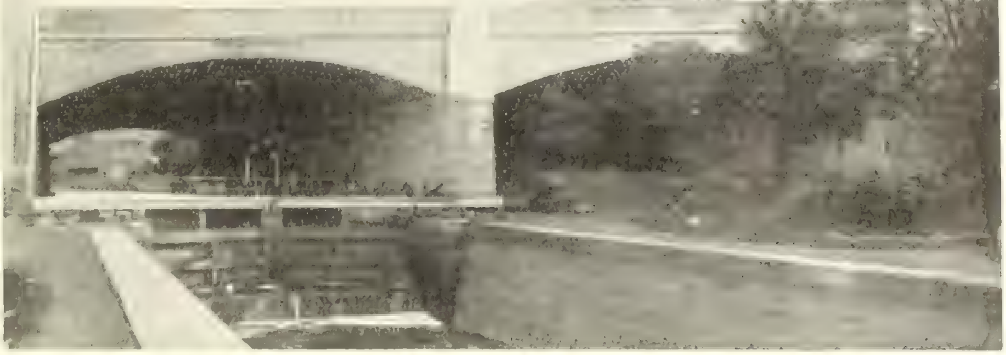

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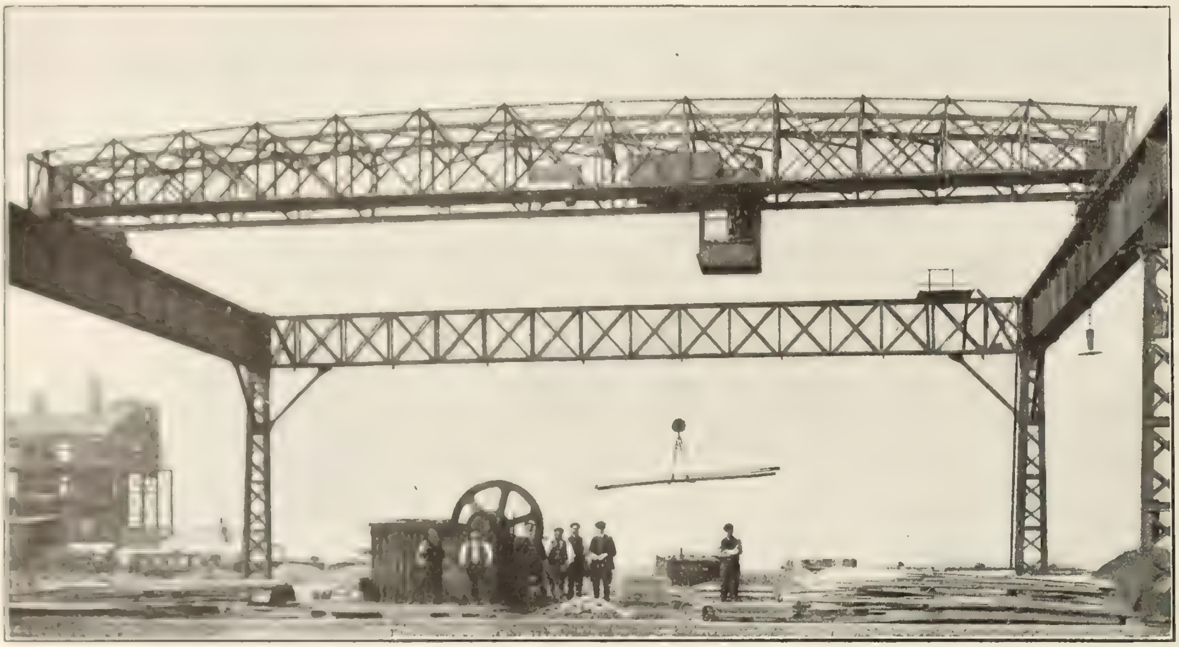

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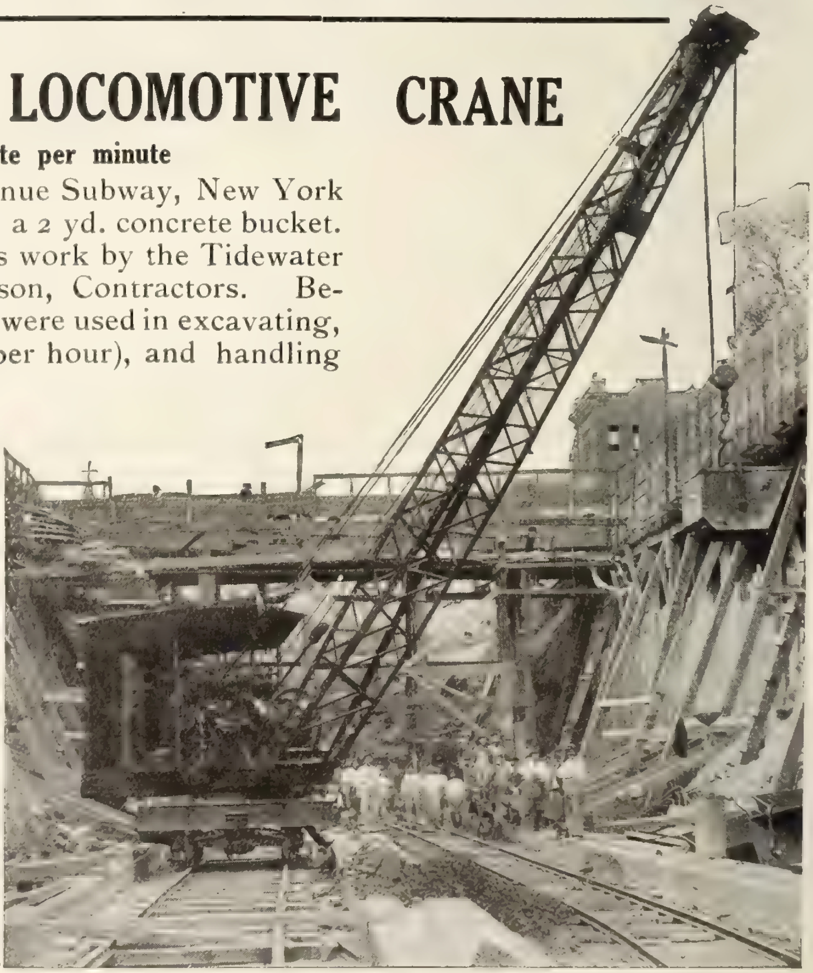

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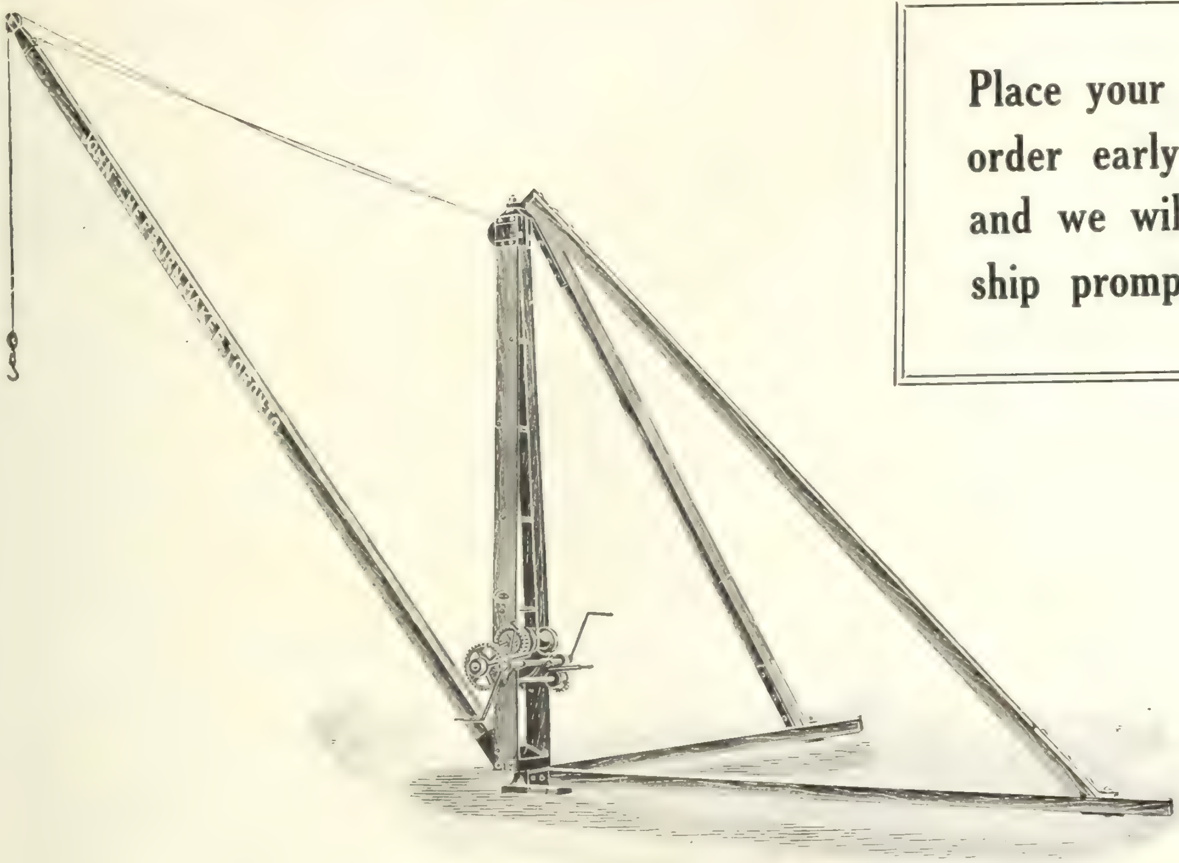

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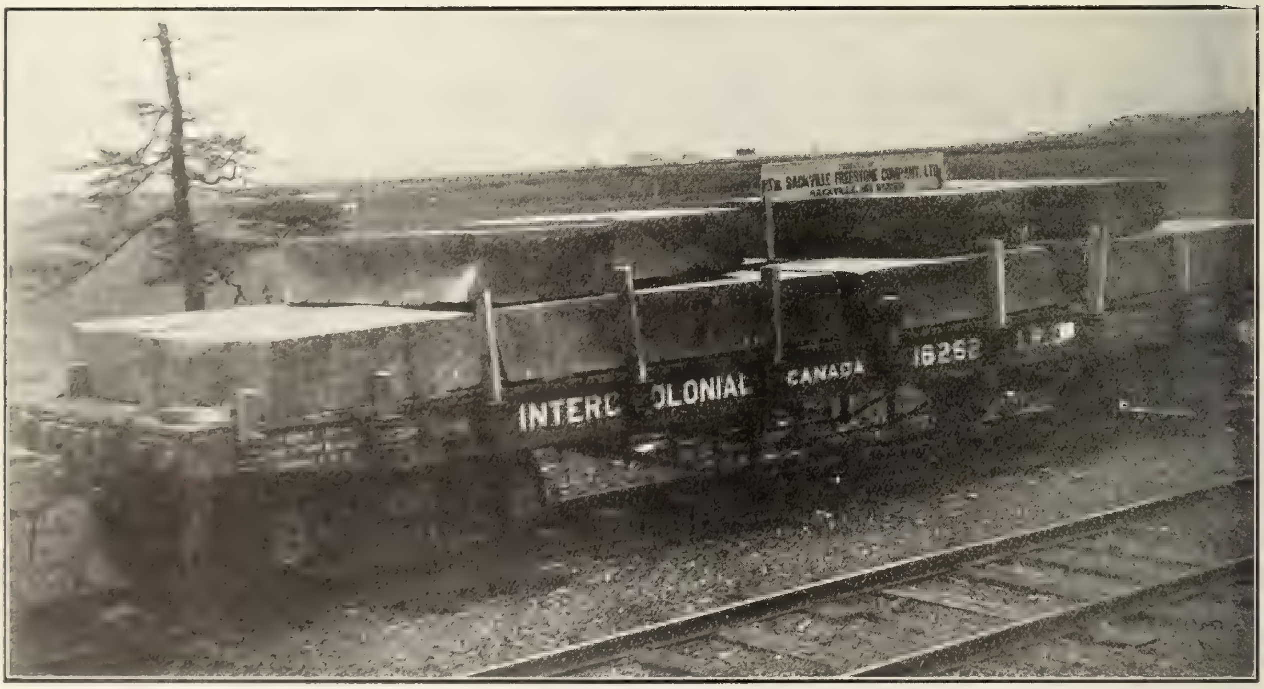

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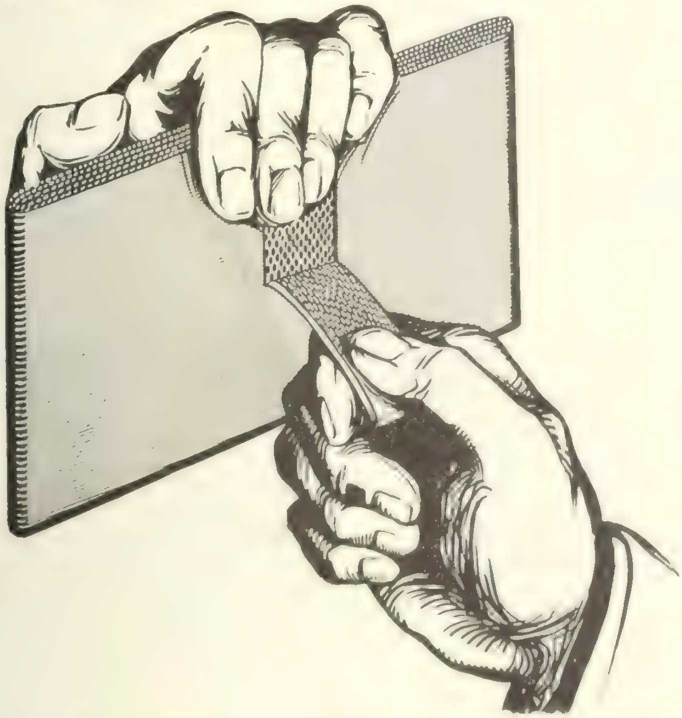

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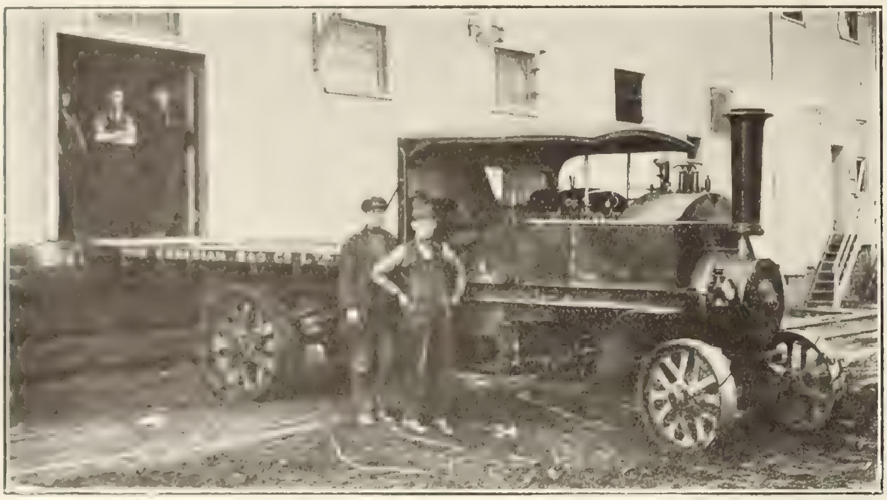

Various types of bodies may be fitted to trucks to suit conditions

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The upper cut illustrates a Lorry type and the lower a Tipper.

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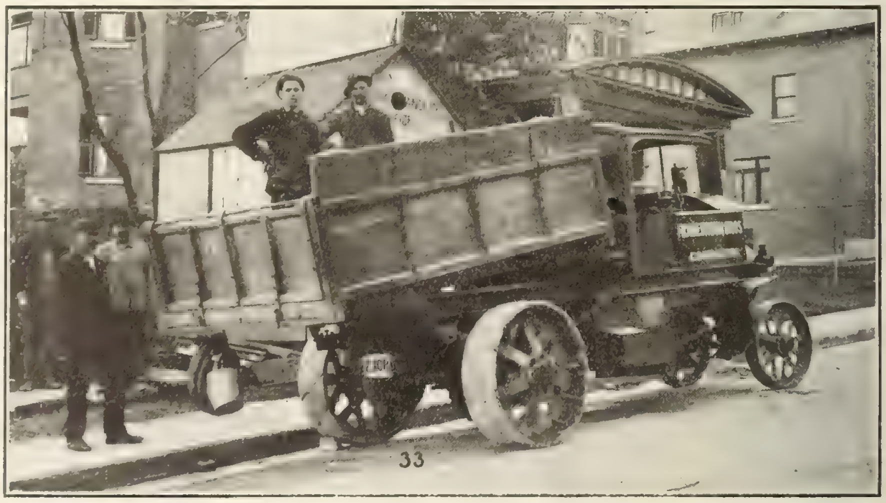

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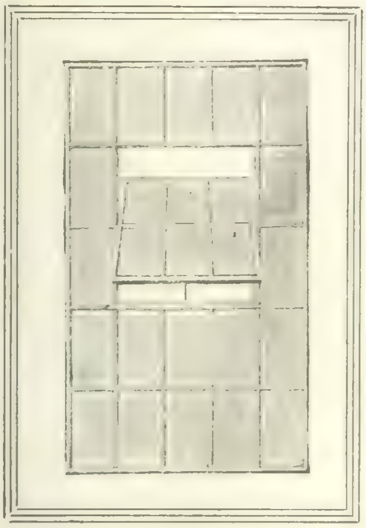

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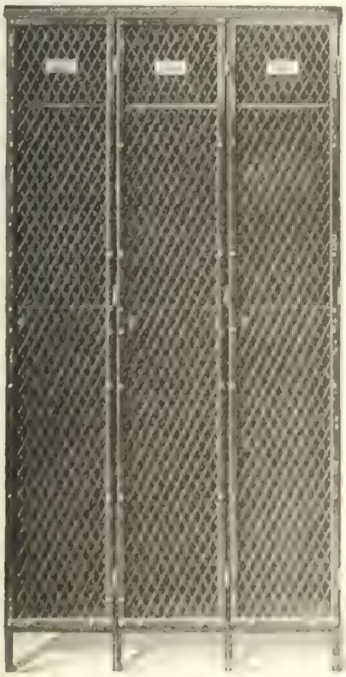

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ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY
HUGH C. MacLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.
HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
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LONDON, ENG. - - - 3 Regent Street, S.W.

SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 27 **January 22, 1913** **No. 4**

The Situation and Outlook in the Constructional Field

NOW that the winter season is rapidly advancing it is timely to give some consideration to the prospects for the approaching season. It is safe to say that at no previous time in the history of Canada's constructional development has the outlook been brighter. It is a conservative statement that Canada is about to come into her own in a measure that will exceed the most optimistic hopes of a generation ago.

Business conditions were estabilshed on a stable footing last year, and 1912 must be regarded as a year of outstanding progress. All feelings of distrust that had existed since the depression of 1907 were not only overcome, but forgotten. And it is gratifying to reflect that this great betterment was more or less general throughout the world—as a single evidence of which is the fact that the cement mills of England, Germany and Belgium were unable to take care of the orders received from their regular customers abroad. The business offering, in fact, was so great that the transportation facilities, not only in Canada, but the world over, were absolutely inadequate. The difficulties of transporting material were particularly acute in this country, but this is not altogether surprising in view of the fact that some forty of the leading cities and towns expended the sum of approximately $200,000,000 in building. And the building record, after all, is only one branch of the field: there was corresponding activity in municipal work and in railroad construction, as well as in road building.

These things, considered in conjunction with the fact that 1912 was singularly free from labor disturbances, would compel the most pessimistic person to admit that the present year has a reasonable chance of being a record-breaker. Signs of promise are not wanting. The story has already been started in the series of our Contracts Department.

From every quarter comes news of great undertakings for which arrangements have been definitely completed. The transcontinental railroads, the Canadian Pacific, the Canadian Northern, and the Grand Trunk Pacific, are entering upon the most comprehensive programmes in their history, having planned the building of 2,700 additional miles of track at a cost of some $40,000,000. Municipal construction has received a great impetus through the spread of building during the last year or two. Road and street work are being promoted energetically to keep pace with the developments of our town and cities.

To crown all this, comes astonishing proof that the stimulus is still there: that as our towns and cities approach what, at one time, we should have considered maturity, the growth in the more advanced state is even more vigorous than at the beginning. During the first two weeks of 1913 the value of Toronto's permits was double that of the corresponding period a year ago. And Toronto, perhaps the most normal city of the Dominion, expended during 1912 no less than twenty-seven and a half million dollars! We mention Toronto: similar reports are already to hand from Winnipeg and Calgary—and both of these cities spent more than twenty million dollars on building last year!

A particularly favorable circumstance just now, as we have observed, is the absence of trepidation. Conditions are established more firmly than they were at the opening of 1912; the political situation is satisfactory; European war possibilities do not loom so large. Indeed, the one cloud on the horizon is the possible expansion of trade faster than money and credit can be provided.

There is every reason to believe that construction work will open up early in 1913. Many important undertakings were placed under way all over the country late in 1912, and the promoters are anxious to make progress and to get some return from their investments. With this in mind, contractors will be well advised to make the best progress they can during the winter months, and keep their forces intact in readiness for the spring work.

* * *

It is fair to ask: "Where will 1913 end?"

We have no hesitation in predicting that from both the national and industrial standpoint, 1913 will be the year of Canada's greatest achievement. It rests with ourselves to make it the greatest year from the individual standpoint. If we do not make the most of our opportunity at this stage of Canada's development, generations unborn will ridicule us for our stupidity—just as we ourselves, perhaps, have referred to the short-sightedness of those who have preceded us.

* * *

The supply market has maintained a good level and there have been little changes of late.

Enquiries in the iron and steel trade reveal the greatest optimism. From Montreal comes the report that steel makers are contracting for deliveries for the fourth quarter and making enquiry as to 1914 conditions. This is stated to be the first time in the history of the steel business that deliveries have been disposed of a full year in advance. As a whole the steel mills have contracted for three months' full output with three to five months' work in addition.

The lumber market is firm, with few changes in price. It is timely to make the reminder that there will be a considerable shortage of lumber during 1913. This is due to the unprecedented demand during 1912, the short stocks held in consequence by the manufacturers, and the comparatively smaller cut of the past season.

There is the usual scarcity of brick, but the facilities are constantly increasing and with the number of large new plants in operation in various parts of the country, there should be less difficulty in getting orders filled. In the same way, the problem of getting cement into the west is not likely to be as acute as it was last year, both the amalgamated interests and the independent concerns having made great progress in the way of extensions and transportation facilities.

Success in Municipal Engineering

IN another column we record the death of the City Engineer of Dublin, a man of whom it was said that he was one of the successes of the Irish capital, and that his professional life had been lived without a mistake.

The sentiments are expressed in an obituary notice in a British journal too well known and too representative to require introduction. We find ourselves contrasting such conditions with those on this side of the Atlantic. Recent examples are not lacking of men who have served their city a span longer than the score of years placed to the credit of the City Engineer of Dublin, and who at the end of that time have been allowed to retire into comparative obscurity with a slur upon their reputation.

It seems that the engineering profession in Great Britain enjoy a better professional status than in this country. Marks of favor are constantly being conferred upon them. Last year the Chief Engineer to the London County Council was knighted and became a Commander of the Order of St. Michael and St. George. In 1912, also, the Lord Mayor of Bristol, a member of the profession, was knighted. The dignity of engineering is thus upheld and incompetent men do not take it upon themselves lightly to criticize the work of those in high places.

The same emolument is not obtained in Great Britain, but there is at least the satisfaction of knowing that a respectable-sized halo will appear about a man's head after he is gone. In Canada, the municipal engineer too often passes through years of tedious work and wanton criticism and then dies unhonored and unsung.

The late City Engineer of Dublin was fortunate.

Lessons from a Failure in Reinforced Concrete

BUILDING failures have been comparatively few of late years in Canada, but it is well to take careful note of constructional practice, good and bad, in other cities and to remember that eternal vigilance and safety are inseparable. The reflection is induced by some facts that have just come to light concerning the failure of a 3-storey reinforced concrete garage at Detroit, in which three men were killed and a number of others injured, the jury bringing in a verdict of negligence against the firm of designers and also against the contractors.

The building in question was a three-story and basement structure, 120 feet deep, 70 feet wide at the street front, and 66 feet 6 inches wide at the back alley.

The layout was of the ordinary beam-and-column type, carrying tile-and-concrete floors of varying spans. The columns were rectangular in section, reinforced with straight "Gabriel ovoid" bars, and rested on square pedestals on good footings. Most of the beams were of T-section (with exceptions as noted below), reinforced with "ovoid" bars in the bottom, turned up to give tensile value over supports and tied together with the typical "Gabriel" loops, as stirrups. The slabs were of the tile-and-concrete type shown in the detail on Fig 1. Brick curtain walls formed the main showing faces. It is not clear whether the third floor was supposed to be the roof or a working floor, but that is not material at this time.

The concrete work was started last fall, and on October 15th the casting of the second floor was completed. The work then proceeded so that on November 15th, 1912, the third floor in the rear of the building was being deposited, when, after a brief warning by cracking supports and sagging girders, the month-old second floor collapsed with the disastrous results noted.

The following pertinent observations are made editorially by The Engineering News to whom we are indebted for the details:

"The failure is another of those catastrophes which could easily have been predicted from the elements that went into the building. Consider what they were: an architect quite ignorant of structural design, the designer a commercial firm whose responsibility ended with the sale of the steel, the contractor a mere renting agent of equipment, a building department incompetent to guarantee observance of its own code, and finally a contract between owner and builder which encouraged cheap material and methods. Is it any wonder that the building had numerous members designed with too low a factor of safety, that the concrete was weak, that the methods of construction were improper and that death and loss were the ultimate end of the project?

"Competent engineers can learn nothing from the failure that will aid them in future design. The errors which marked the design and construction have long since been set down as errors; the fatal consequence of disregard of good practice only emphasizes what was already known. The important lesson from the failure is that these errors were the natural result of the system under which the garage was built.

"As long as architects turn over structural design to steel salesmen, and steel salesmen design structures which they do not follow beyond the drafting room and paying-teller's window; as long as contractors play with concrete framework as though it were a concrete sidewalk which cannot fall down, so long will honest concrete men be kept busy explaining that a certain failure was due to ignorance and negligence.

"The concrete trade press has called this collapse 'another workmanship failure.' That is an incomplete characterization. The responsibility is just as heavy on the architect and the designer, even if the structure as designed would have stood forever if built by an honest competent contractor. In the concrete business more than in any other branch of engineering, the engineer must design with an eye toward the construction and must have always before him a clause which should be in capital letters in every code of engineering ethics—'It is unprofessional for an engineer to sell a design the execution of which he cannot supervise.'

"Finally, the failure shows up clearly the futility of half measures in revising building laws. Detroit apparently is justly proud of its new building code, which is administered by well paid political appointees. Perhaps now its citizens will understand that a few engineers might be of value to execute the law."

The Value of Incomplete Estimates

THE increasing complexity of modern industry introduces so many variable factors into investigations of initial and running costs that a feeling has grown in some organizations that incomplete estimates are of little value in the determination of future policies, says the Engineering Record. Engineers meet this attitude from time to time in presenting studies of plant development, in analyzing before busy executives the economies of different operating methods, and in recommending specific action based upon necessarily incomplete test data. It is frequently assumed by clients that because some of the elements in a computation have to be selected arbitrarily, the results of the figuring are to be given little weight, and the outcome is often accordingly disadvantageous to the best interests of those who refuse to give proper credit to the assumptions and judgments of the expert adviser.

It ought not to be necessary to urge the real value of incomplete estimates in connection with engineering propositions, for the time-honored maxim that half a loaf is better than no bread applies forcibly in such cases, provided that the outside limits of the problem are recognized. There is the real difficulty, and it can best be overcome by carrying through the analysis in particular instances with maximum and minimum allowances for the uncertain factors involved. The sense of proportion in making studies of industrial cost is consequently invaluable, and it is this which is cultivated by the specialist in fore-casting the total expense of a program within a stated field of practice.

To illustrate, a central station desiring to install its service in a factory sends a force of power engineers to the spot, lists all the machines in use, determines the average and maximum power demands of the installation from indicator cards taken at the engine cylinders, and after making a study of advisable rearrangements for the use of the motor drive, prepares an estimate of the yearly cost of operation under the new service, including fixed charges. The degree of completeness of the estimate is likely to vary a good deal according to the conditions present, but whether the data set forth are based almost entirely on tests or on existing records of the plant, some assumptions will inevitably have to be made before the report is finished. The reason is that the determination of total costs, including fixed charges, is not an arithmetical process pure and simple, but includes the application of skilled judgment, to the depreciation factor in particular, and often to such a question as the limit of fuel economy in installations of specified types and with prices of coal ranging between stated limits. Despite these uncertainties, some of which can be cleared away if enough time and money are expended in the work, a more or less hypothetical estimate may be sufficient to determine whether the existing plant should be continued or central station power substituted, and in such cases the problem is often solved without the refinements of investigation which theoretically at least should never be omitted in a determination of the issues.

The difference is that between an analysis which is thoroughly scientific and one which is sufficiently accurate for commercial purposes. Where to draw the line between the two is the critical decision for the engineer. His reputation depends upon his ability to weigh the factors involved and to avoid the unpleasant experience of having his results entirely vitiated by some overlooked condition. The proper line of attack in work of this kind is laborious; it requires a willingness to work out many estimates with the factors changed one by one or perhaps in groups; and finally, in relation to the influence of the report on the client, it calls for the preparation of estimates for the extreme conditions of the case and the careful marshaling of assumptions in a form in which they can easily be checked or audited by an acute questioner. Engineers of broad-minded type realize that nothing is lost by setting forth such assumptions, either in the body of the report or in an appendix, in such manner that another engineer can weigh the work and compare the methods employed with his own. Nothing is intended in these comments to deprecate the making of tests in the field as a basis for report recommendations, but in engineering the question of cost should determine the expediency of the detailed practice followed, and a sound appreciation of the commercial side of industrial researches is a valuable asset in relation to the preparation of estimates.

The brown, white and yellow stains which frequently disfigure brick buildings or walls are the result of a saline efflorescence which may sometimes be removed, according to the Bibliotheque Universelle, by washing with slightly acidulated water, when pure water proves inadequate. Prevention, however, is better than cure. The stains are caused by particles of soluble salts which have been carried to the surface by water and are then crystallized by evaporation. These comprise sulphates of potassium, sodium, aluminium, magnesium and calcium, the last being the one commonest found and the one most resistant to rain. Chlorides and carbonates are also often found. These salts pre-exist either in the earth or in the waters used in manufacture, or in the mortar or sand, the latter being especially the case near the seashore, where sand from the beach is commonly used without the precaution of washing with fresh water. The entry of salts into the brick may occur during the baking also when the coal contains pyrites. Care should be taken, says the Scientific American, to use water of low mineral content, especially as regards sulphates. Where only "sulphur water" is available it should be neutralized with a barium salt (the chloride or carbonate).

Mr. Phelps Johnson, Montreal

President-Elect of the Canadian Society of Civil Engineers

27th Annual Convention of the C. S. C. E.

Arrangements Completed for 3-Day Session of Civil Engineers in Montreal Next Week—Mr. Phelps Johnson President-Elect

The 27th Annual Meeting of the Canadian Society of Civil Engineers will be held in the rooms of the Society, 413 Dorchester Street West, Montreal, January 28-30. The following is the programme:

Tuesday, 28th January.

10 a.m. Meeting for the nomination of scrutineers, receiving the report of Council, reception and discussion of reports of Committees, and transaction of the general business of the Society.

1 p.m. Adjournment for luncheon, to which the visiting members are invited by the members resident in Montreal.

3 p.m. Continuation of the business meeting for the discussion of reports, etc.

4 p.m. An address by the retiring President, Mr. W. F. Tye.

8 p.m. Smoking Concert in the new quarters of the Society, 176 Mansfield street. Complimentary.

Wednesday, 29th January.

Visit to the Montreal Steel Works. The party will leave the Windsor Hotel at 10 a.m. sharp. By the courtesy of the Montreal Tramways Company special street cars will be provided to convey the party to and from the works at Longue Pointe.

3 p.m. Business meeting. Discussion of reports.

8 p.m. Annual Members' Dinner.

Thursday, 30th January.

10 a.m. Meeting for the reception of reports of scrutineers. Continuation of the business of the Annual Meeting.

2.30 p.m. The meeting will reassemble, if necessary, for the conclusion of business. On adjournment a meeting of the Council will take place.

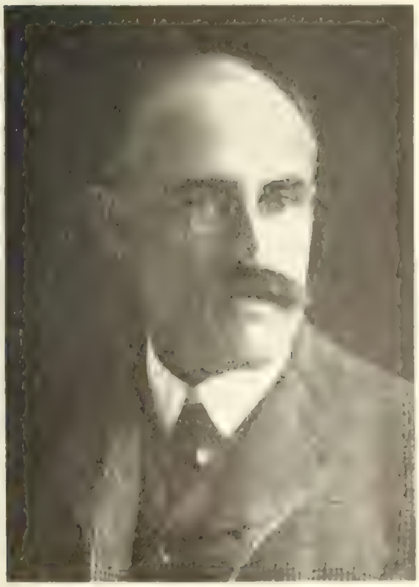
The President-Elect

Mr. Phelps Johnson, general manager of the Dominion Bridge Company, Lachine, P.Q., and President-Elect of the Canadian Society of Civil Engineers, is an American by birth, having been born in Orange County, New York. He was educated in Springfield, Mass., and commenced his business career there. Before going to the Dominion Bridge Company he was identified with engineering for three years at Canton, Ohio.

It was in 1882 that he came to Canada. Since then he has been associated with only one company—the Dominion Bridge, of which he is now the executive head. In that year he went to Toronto as engineer to manage the works of the company, and from 1888 to 1892 he was chief engineer of the company in Montreal, afterwards being appointed general manager. Mr. Johnson has thus worked his way up to the position he now holds as chief of the largest bridge company in Canada, with their main shops just outside Montreal and branches in Winnipeg and Toronto.

The company built their first shop in 1885 and commenced to extend in 1897, since when the production has gone ahead at a tremendous rate, and annual capacity being more than twelve times that of 1897. Some of the largest undertakings in Canada have been carried out by the company, these including the double-tracking of the Lachine bridge of the C. P. R., illustrated in our issue of January 8. The company have recently taken over the National Bridge Company.

Mr. Phelps Johnson is also President of the St. Lawrence Bridge Company, which was formed to execute the contract for constructing the steel superstructure of the Quebec Bridge. As is well known, the Dominion Bridge Company is very largely interested



Mr. W. F. Tye, Toronto
Retiring President

Professor C. H. McLeod, Montreal
Secretary

Mr. C. H. Rust, Victoria
President 1911

in this work, to carry out which, large shops are being erected at Lachine.

At the last annual meeting of the Canadian Society of Civil Engineers Mr. Johnson was elected a Member of the Council.

Transportation Arrangements

By the courtesy of the railways of the Eastern Canadian Passenger Association, members and their families who have paid a full one way first class fare going to the meeting in Montreal, will be returned free on presentation of a Standard Convention certificate signed by the ticket agent from whom a ticket has been procured at the point of commencement of the journey. The certificate is to be endorsed by the Secretary of the Society, and to be vised by a special agent of the Passenger Association who will be in attendance at the meeting from 3 p.m. to 6 p.m. on Wednesday and Thursday, January 29th and 30th. A fee of 25 cents will be charged by the Passenger Association in each case. Tickets may be purchased and are available three days before the commencement of the meeting, and the return journey may be made three days after its conclusion.

A further extension of time will be granted to persons residing west of Fort William, making the free return available for fifteen days after the close of the meeting; the ticket to Montreal having been purchased at any time and receipt obtained on the Standard Convention form as above.

Ottawa's Typhoid Epidemics

SOME noteworthy observations are made by Dr. Camac, of Columbia University, in a report on the recent outbreaks of typhoid in the city of Ottawa. Dr. Camac has had extended experience in this field and his conclusions regarding the need for stricter governmental supervision of municipal sanitation, water supply and drainage systems merit careful consideration at this time. Dr. Camac discusses at some length the two forms in which the disease appears, namely, the sporadic form—usually traceable to some source outside of the locality in which the disease appears—and the epidemic form, under which head comes the Ottawa visitation. The report continues:

"The two outbreaks through which Ottawa has passed were caused by the commonest and best understood of all the causes of disease—namely, the contamination of drinking water by sewage. In other words, that which is scrupulously avoided in the care of the typhoid case, was, by the contamination of the Ottawa water supply, brought about in the grossest possible way.

While nurses were disinfecting discharges and sterilizing the utensils of those known to have typhoid, thousands of other persons, harbouring the germ in one or the other of the ways referred to above, were transmitting organisms through the foul water directly into the alimentary tract of innocent victims.

Ottawa is outwardly a beautiful city. It is the seat of the government of Canada, a country rapidly striding into international prominence. Her people, by ever increasing railway and steamship systems, are traveling, not only through Canada, but also through the United States and other countries.

From the modes of harbouring the organisms given above, it will be seen that during and after such epidemics as Ottawa has had, every individual from the seat of outbreak may be a menace, not only to his own community and country, but to any which he may visit. The typhoid epidemic to-day is an unpardonable crime against the world. It is scientifically punishable under the sixth commandment. By scientifically is meant that science has proven that typhoid epidemics are preventable by well known and thoroughly tested methods, which, if not adopted, render the authorities guilty of murder. The command to adopt such measures should be coupled with the charge, "Thou shalt not kill."

Prevention of Typhoid.

In no other disease has science so clearly and so simply pointed out the methods of prevention. The stage of experiment in this matter has long passed.

Smallpox, yellow fever, cholera and typhus, from being a constant menace to society have become, through the work of science and sanitary engineering, almost unknown.

Tuberculosis, in spite of the persistent ignorance of some communities, is, in its severer forms unknown, and from being looked upon as an inevitably hopeless disease is now among the almost certainly curable. Diphtheria and malaria also must be mentioned in this list of curable and preventable diseases. To acquire these results, the highest type of scientific acumen, the sacrifice of life, the expenditure of enormous sums of money, and legislation, municipal, national and international, have been necessary.

To prevent typhoid, on the other hand, two things only are necessary—two things long recognized as essential to the health of any community—pure water and proper drainage. The official report shows that the Ottawa epidemics, claiming their hundred and fifty-six deaths, were due to the failure to supply these requirements. To the list of the dead must be added those who will suffer from the many sequels now known to be directly due to the typhoid organisms, some being incapacitated for years with consequent poverty and suffering, the full story of which will never be known.

To this also must be added that host of victims stricken down by the typhoid carriers and walking cases, emerging from such an epidemic. These latter can transport the germ in its full virulence to any part of the world, thus connecting the negligence or ignorance of the municipal authorities in one locality with the hideous tragedies of a typhoid outbreak in another, far removed from the original source of infection

Need for Federal Regulation

It costs the Government of the United States $18,000 to complete the education of an officer for the navy. After the most thorough and searching examination, the candidates are selected to serve in maintaining the nation and protecting commerce. The same is true to a large extent of the army. Why should an army and a navy be maintained against possible destruction to empire or commerce while a national menace to life is met by partially prepared or ignorant local authorities? Why should not the maintenance of a National Health Department, equipped with men prepared with the care given to the education of the navy or army officer be considered obligatory? No such national safeguard exists, except in quarantine stations. There is, as it were, a Foreign Office but no Home Office or Department of the Interior for health matters.

Our present system is analagous to despatching a body of city police to meet an invading army or to attack an enemy who had seized some important town. In a military sense the idea is ridiculous, yet this is exactly what is done in coping with a national enemy like typhoid fever. At present, in Canada and the United States, it is not possible for an expert with the authority of the Federal Government to compel a small city whose water and drainage system may be a source of national danger, to correct this condition. That the Ottawa authorities did not realize the far-reaching power of their epidemics, is shown by the fact that they permitted their plan for the annual exhibition, held at Ottawa, to be carried out, drawing thousands to that city, **at a time when new cases of typhoid were still being reported.**

I am told that the experience through which Ottawa has just passed could be repeated at Montreal; that the relation of water supply to sewage is such that a contamination as it occurred at Ottawa might take place at any time at Montreal. If the National Government were responsible for the water supply and sewage, as it is for quarantine stations, coast defences, light houses and harbours, it would be possible to institute uniform measures approved by the highest authorities. Until some such plan is adopted, this question of vital importance will be at the mercy of political manipulation and the ignorance of half-trained officials.

These opinions are expressed with regard to typhoid fever in general. I do not wish to convey the impression, that what has been witnessed in the state of affairs prevalent at Ottawa is peculiar to that city; the menace lurks, under our present health regulations, in many large towns throughout the continent. The grave-yards of Philadelphia and Baltimore are filled with the silent victims of municipal ignorance or political corruption. What, I trust, has been shown is that a typhoid fever outbreak of the proportion of that in Ottawa is a subject for widespread concern. It calls for the most serious consideration of the present health regulations, which make possible so appalling a destruction of life and health in an otherwise fair city.

Is it possible to allow longer so subtle and hideous a national enemy to be met only by local health officers whose training may be inferior and whose appointment may have been the price of some political favour Why cannot our health officers, like our military and naval officers, be removed from petty political influences Why should not this continent benefit in its maintenance of health by the highest scientific ability? Why should commerce receive more adequate protection than public health? Finally, Ottawa's epidemics, and all outbreaks of like proportion, must remain in their consequences a national and international menace **for years to come.**

Large Testing Machines

In a paper read at the Congress of the International Association for Testing Materials, Professor Gaetano Lanza gives particulars of machines for testing full-size members in various parts of the United States. The subjoined list includes only those with a capacity of 600,000 lb. and over:—

	Capacity.
American and Steel Wire Company, Pittsburg.	600,000
Baltimore and Ohio Railroad	600,000
Pennsylvania University	600,000
Pittsburgh Testing Laboratory	600,000
Pressed Steel Car Company, Pittsburgh	600,000
Illinois University	600,000
West Virginia University	600,000
Wisconsin University	600,000
Lehigh University	800,000
Watertown Arsenal	800,000
Rensselaer Polytechnic Institute	1,200,000
U. S. Bureau of Standards, Washington ...	2,300,000
Phoenix Bridge Company, Phoenixville	[illegible]
American Bridge Co., Ambridge	4,000,000
U. S. Bureau of Standards, Washington	10,000,000

The quantities of steel entering into the construction of some of the great transmission systems may prove surprising to those who under-estimate the importance of tower structures. The Southern California Power Company has used to date 20,000 tons of steel tower construction. For the [illegible]-mile transmission from the Mississipi river development at Keobuk, Iowa, to St. Louis, 10,000 tons have been ordered. The Georgia Railway and Power Company's system comprises 5,000 tons, and the Connecticut Power Company's lines 3,000 tons. In comparison with these figures it is interesting to note that an average ten-storey office building, occupying ground 80 feet by 150 feet, requires about 1,200 tons of steel, and that the large Californian system above cited contains enough to build a dozen steel arch bridges like that spanning the gorge at Niagara.

Melting Points of Fire Brick

In the subjoined table we give the results of tests conducted by Mr. C. W. Kanott in a paper contributed to the Journal of the Franklin Institute. It should be noted that in every case the melting-point was taken as the lowest temperature at which a small piece of the material could be distinctly seen to flow.

Material	Melting-Point. Deg. C.
Fireclay brick	15555-1725 (mean 1649)
Bauxite brick	1565-1785
Silica brick	1700-1705
Chromite brick	2050
Magnesia brick	2165
Kaolin	1735-1740
Bauxite	1820
Bauxite clay	1795
Chromite	2180
Aluminia (pure)	2010
Silica (pure)	1750

Huge Girders for a Theatre

The new construction work which has been inaugurated in New York City during the past few years has involved from time to time the use of steel girders of unusual size and weight and the putting of them into place has in not a few instances required no little engineering skill. One of the noteworthy operations now rapidly approaching completion at Broadway and Forty-seventh street is the new Palace Theater, the entrance to which is on Broadway. Some rather unusual steel construction work has been successfully accomplished in connection with this building, the huge girders spanning the auditorium being much larger than usually required even in some of the tallest office buildings.

There are five girders altogether, each 86 feet in length, 8 feet deep and each weighing over 30 tons. By reason of their unusual length and weight not a little difficulty was experienced in placing these girders in position, seeing that it was necessary to raise them to a height of 80 feet above the auditorium. In doing this work an Oregon fir mast 110 feet long and 30 inches in diameter at the butt was used, the mast itself weighing 9 tons.

On the Broadway side a 12-storey building is being erected, the upper floors of which will be used for theater offices. The theater building proper is 88 feet wide by 125 feet deep and will seat 1800 people. The balcony and gallery are carried by heavy cantilever girders which in turn are supported by a huge girder spanning the full width of the building and thus eliminating all columns that might obstruct the view of those in the audience.

Filling the hollow space behind the base board a foot deep with cinders mixed with a little cement and water in the proportion of, say, 10 to 1, makes a good fire stop. Sand mixed with cement in the same way [illegible] makes an excellent [illegible]

Brick and Clay Men Gather at Toronto

Many Bright Features at the Annual Meeting of the Canadian Association—Noteworthy Optimism and Trade Unity

THE seventh annual convention of the Canadian Clay Products Manufacturers' Association was held in Toronto, on January 14th-17th. A large number of the members of the association attended this convention, which proved to be the most successful yet held. An excellent programme had been provided and the members spent a most instructive and pleasurable time. Mr. W. H. Freeborn, of Brantford, president of the association, occupied the chair at the various meetings. In addition to the business sessions, which were held daily, visits were made to the plants of the Milton Pressed Brick Company, Limited, at Milton, and several brick plants at East Toronto. Mr. McCannell, the president of the Milton Pressed Brick Company, Limited, provided a special train to take the guests to his plant, and over one hundred availed themselves of his invitation, among the party being a number of ladies. The visit to this plant gave great pleasure to all those present, and a hearty vote of thanks was accorded to Mr. McCannell. One of the most striking features of this plant is the very noticeable absence of dirt in all the departments, the engine room having more the appearance of a well-kept dairy than a place usually associated with oil and grease. Mr. McCannell stated that not only was it a great pride and satisfaction to him to have the place looking spick and span, but it was also very economical, as the absence of dirt in the machinery undoubtedly saved large amount of money for repairs. After the inspection of the plant, refreshments were served in the engine room and the special train took the party back to Toronto. In the evening, a very successful smoking concert was held which was thoroughly enjoyed.

The new President of the Association
Mr. Chas. A. Millar, Toronto

On Thursday two excellent papers were read, one by Mr. Geo. Raymond, "A Talk on Kilns," and the other by Mr. Wickens on the subject of "Boiler, feed water and scale." Both gentlemen answered a number of questions on these papers, and by this means the members obtained a lot of valuable information which will be useful to them in running their plants. In the afternoon the city of Toronto provided automobiles for the benefit of the visitors and these conveyances were used as a means of getting out to the East Toronto plants.

In the evening the annual banquet of the convention was held at the Prince George hotel, at which a number of ladies were present. After an excellent menu had been enjoyed, Mr. Lochrie acted as toastmaster for the evening. The speeches were interspersed with music. The guests numbered over 125.

Everybody Optimistic

The feature of the speeches was the general optimism expressed on the prospects of the clay products business and what an important part brick took in the industrial life of the country. Some of the members of the asociation had visited the University of Toronto in the afternoon with a view of ascertaining what prospects there were for a ceramic department in the University. Unfortunately the University is lacking in funds, and unless some special arrangement can be made to obtain money for such a department, it is feared that nothing can be done along the line of establishing a Faculty of Ceramics just at present. The feeling at the meeting, however, was that energetic steps should be taken to obtain money for this purpose, and that such an important industry should undoubtedly have a branch of its own at the University.

Mr. W. H. Freeborn, Brantford, President 1912

Some of the guests of the evening were:—Dean Galbraith, Professors Gillespie, Wright, and Coleman, Dr. Ellis and Mr. Joseph Keele.

On Friday morning the visitors were entertained at the Strand Theatre to a series of views on old-fashioned and up-to-date brick manufacturing processes.

At the afternoon business session, the election of officers for the year took place, and the following were elected:—Mr. C. A. Millar, Toronto, President; Mr. David Martin, First Vice-President; Mr. Geo. Crain, Second Vice-President; Mr. G. W. Moodie, Third Vice-President.

It was decided to hld the next meeting at Toronto. Most of the members, however, have decided to attend the meeting in Chicago, which takes place on February 28th to March 8th, and there will undoubtedly be a large number of Canadian clay products manufacturers present.

Supplementary details of the proceedings of the convention will be published in the next issue.

Feed Water and Boiler Scale in Steam Plants*

By A. M. Wickens, Toronto

FROM the fact that I have spent many years as an engineer and also as a boiler inspector, I have arrived at some conclusions that are impressed very strongly upon my mind regarding feed water, boiler scale, and other troubles that are inherent to the operation of steam plants.

In many of our manufacturing enterprises the steam boiler seems to be the part that receives the least consideration or attention from the owner or manager. A steam boiler is not a very handsome looking piece of apparatus; it is generally (in the owner's mind) looked upon as a miserable, dirty affair, buried in brick, soot, ashes, etc., etc. Then with the assistance of the architect it is placed in some dark out-of-the-way place, is pinched for room and is set without regard to many of the essential points necessary for economy, without adequate means to keep it clean either outside or inside. This to my mind is very strange, because as a matter of fact the boiler is really the heart of the whole establishment, and source of all mechanical movement as well as all heat required in process of manufacture, consequently it should have every advantage that ingenuity and carefulness can afford.

When boilers have been considered as a necessary evil, the subsequent treatment of them is usually of a very meagre character, with a result to the boiler of a short and wasteful life. We have many kinds of waste going on all the time in connection with our boilers—some from faulty construction, many from defective setting, insufficient draft, bad management of the fires, poor fuel, and many from the use of bad feed water, together with a collection of soot, ashes, mud and scale. To get good results and economical work we must see that the surfaces of the metal are perfectly clean, both outside and inside. If we allow the outer portions that are exposed to the fire to become covered by soot, we have applied one of the best non-conductors of heat known to science. Again, if we allow the flame bed and combustion chamber to become choked up with ashes so as to interfere with the draft, we are distilling part of the coal into soot. Then if we allow the interior to become coated with mud, sludge or scale, we have added another first-class non-conductor of heat. The same applies to oil being allowed to gather upon the metal, with the added difficulty that the oil will surely make leaks at the rivetted joints if it reaches them.

Efficiency of Boiler

The efficiency of a boiler is the proportion of the heat in the coal that the metal will transmit to the water in the boiler. A well set, well fixed, clean boiler will utilize from seventy to seventy-five per cent. of all the heat given off by the burning coal. The average efficiency, however, does not reach sixty per cent., consequently it pays to have everything clean and well managed.

The ideal water for boilers is one that does not deposit scale, does not corrode, and does not cause the boiler to foam. Unfortunately, such water does not exist in nature. All waters carry more or less scale-forming material in solution. Unless it is rain water collected from roofs and not allowed to come in contact with the earth. This scale forming material is composed of compounds of lime, magnesia, iron, alumina, silica, etc., of these the carbonate and sulphate of lime, and the carbonate and sulphate of magnesia from ninety-eight per cent. of the scale, and it is these four compounds that cause the trouble in boilers.

Carbonate of lime is the chemical term for limestone marble or chalk. It is the commonest form in which lime is found in water. It is only slightly soluble in chemically pure water, but it is very soluble in water that contains carbonic acid gas. Rain water in passing through the air absorbs carbonic acid gas from it. When the water charged with carbonic acid gas passes through the soil it dissolves more or less of the lime in the soil, and in cases where the water comes in contact with limestone the amount of lime dissolved by the water passing through it is very large. When such water is boiled the carbonic acid is driven off by the heat, and the lime which it held in solution is deposited in the boiler. The white, chalky-looking matter washed out of our boilers is nearly always impure carbonate of lime. Sulphate of lime is commonly known as gypsum or plaster of paris, is found in many waters, and is responsible for a very hard scale often as hard as porcelain. This will not precipitate until the heat is about 300 degrees or fifty-five lbs. gauge pressure, and it comes down in the form of heavy crystals which unite readily with the other deposits and form a cement-like coating. This makes a very poor conductor of heat.

It requires 34 lbs. of water an hour to make one horse power, a one hundred horse power boiler would need for a day of ten hours, at this rate, 34,000 lbs. of water or 3,400 gallons, and each gallon of feed water will carry with it a certain amount of scale-making material, so that even with very good boiler water, we soon accumulate considerable scale. A feed water carrying twenty to forty grains of solid matter per gallon is said to be a fairly good water for boilers.

In the boiler quoted above if we have only twenty grains to the gallon, a deposit of fifty pounds will be made in one week's run of sixty hours. By using a factor of three for the specific gravity of the scale it would cover 250 sq. ft. of surface to a thickness of .0144 or 1/16 inch thick in [illegible]

Scale Formation

With waters carrying greater quantities of solid matter the deposit would be proportionately greater. There have been many experiments and tests conducted to determine the loss caused by scale of different thickness and different composition. It is now generally accepted that hard scale 1/16 inch thick causes from ten to thirt[illegible] fuel, and as the scale thickens this increases until at a thickness of [illegible] it is 30 per cent. We frequently notice upon breaking a piece of scale that it is composed of several layers of different colors and interspersed with thin layers of muddy matter. This shows that the scale was formed under different conditions as to circulation and heat. The plate under this scale often times shows unmistakable signs of wasting away. This is more marked where the water carries any of the iron salts, and in water that is blackish it is the chloride of magnesia which will attack the iron or steel of the boiler very quickly. The circulation of water in all boilers while making steam is continuous; it is quite rapid from the hottest places, thus carrying the scale-forming matter to cooler and quieter places to form the deposit. This assists in keeping the part that evaporates the most water, clean, thereby extending the life of the boiler. Boilers evaporate about twenty times more water per square foot of heating surface immediately over the grates than at any other part. This increases the speed of the circulation rapidly and carries away nearly all scale-forming properties to the stiller parts of the boiler for deposit. Most of the scale is deposited between the tubes upon the heads and at the sides of the boiler opposite the tubes. Hard or thick scale very seldom forms directly above the grates, and when it does it means a repair job soon. Sometimes we find a pile of loosened scale upon the fire sheet. This is caused by pieces of scale, too heavy to be carried away by the circulation, dropping down from between the tubes, several of them lodge together, the lighter pieces in floating by stick to them, then some clay or silica lodges with them and we soon have a packed waterproof mass. This packs close enough until it prevents the water reaching the sheet, and the result is that the sheet becomes red hot, and the pressure of steam forces the sheet outward until it causes a bulge or bag. If this process goes on long enough the sheet stretches until it is so thin at the apex that it will not hold the working pressure, then an explosion occurs, such as that which happened in Toronto on September 4, 1904. I have seen boilers so badly scaled up between the tubes and on the shell sides that the efficiency was reduced from forty to fifty per cent. The effect is that the life of the boiler is very materially shortened and the danger from explosion greatly increased.

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*Paper presented at the Annual Convention of the Canadian Clay Products Manufacturers' Association.

Nature of Boiler Compounds

We have almost numberless boiler compounds or purgers of various kinds which we will only refer to in a general way. Some are entirely mechanical in their action, such as wires, plates, twigs, and brushes, which are supposed to catch or entangle scale-forming particles and prevent them from forming on the plates. Others are chemical in their action, others are potatoes, peas, wheat, moss cutch, etc. These latter are expected to form centres about which lime and magnesia will form. Others, again, are a combination of chemicals and vegetable extracts. There is no compound made that will be suitable for all waters. The hardness of water depends upon the quantity of lime and magnesia it carries. There are two kinds of hardness—designated as "temporary hardness, and permanent hardness." Temporary hardness is due to the carbonates of lime and magnesia, and permanent hardness to sulphates of lime and magnesia. The carbonates can be treated by anything that will force the carbonic acid gas from the water. The sulphates will not yield to the same treatment, because they do not depend upon carbonic acid gas to carry them. Common soda or soda ash will remove most of the carbonates if properly used, which means the blow off cock should be opened for a minute or so several times a day. Caustic soda will usually remove the sulphates and will not injure the metal of the boiler, but the boiler should be blown down frequently while it is in use. It has always appeared to me that a boiler should not be used as a tank for treating water with chemicals. In Europe for many years they have been treating the cold water in separate tanks for the removal of all scale-forming properties, this is a paying plan in all larger steam plants.

We also find serious trouble with boilers having oil in them. This occurs where exhaust steam from the engines is used for heating and drying purposes, and the water of condensation is used over again. Prof. A. Durston says oil in boilers is very dangerous because it is a very bad conductor of heat. He experimented with tubes and found the thinnest film of oil reduced the conductivity of the metal eleven per cent. He also found with an experimental boiler, the temperature of the metal next to the water with a clean plate was 430 degrees, and with a thin film of oil it was 617 degrees, or 187 degrees higher. Showing that the water was not taking up the heat as fast as it should with an oily plate, a clean boiler well set is almost smokeless; it will make steam rapidly when required; it will last longer, and be very much safer from explosions and shut-downs for repairs.

Quebec Architects' Annual Meeting

The members of the Province of Quebec Association of Architects held their 22nd annual meeting on January 11 at the offices, in Montreal, with Mr. Jos. Venne, president, in the chair.

The report stated that eighteen new members had joined during the year, making a total of 147. The series of lectures had not been a success, and without dropping them entirely, it was suggested that one or two might be arranged. The balance sheet submitted by Mr. Hugh Vallance, showed receipts of $5,135, and a balance of $3,425.

Mr. W. E. Doran suggested that the public needed education as to the status of architects. He advocated open conferences at which the public would be admitted, believing that it would be for the benefit of the profession. On the question of competitions, Mr. Doran expressed a strong objection to them. They were, in his opinion, injurious to the profession, and were undignified; the conditions, too, were often violated by the men who made them.

Mr. W. S. Maxwell, in defending competitions, stated that they were of great use in causing a departure from the routine class of design turned out in government offices. Moreover, competitions allowed a chance to young men with no particular social or financial influence to come to the front. He believed in competitions conducted on proper lines.

Mr. Doran replied that his chief objection was to the association recognizing competitions by sending out notices regarding them. He also resented the association interfering with the affairs of his business and those of clients, instancing such matters as uniform contracts.

Mr. W. S. Maxwell suggested that the members of the association, in their private capacity, might provide capital for acquiring premises which could be used as headquarters for the association. The question was referred to the council to appoint a special committee.

The following officers were elected: President, J. P. E. Dussault, (Quebec); 1st Vice-pres., W. S. Maxwell; 2nd Vice-pres., Jos. Perrault; Secretary, J. E. Vanier; Treasurer, Hugh Vallance; Members of the Council: Messrs .J. Venne, S. Haskell, E. Payette, K. G. Rea, F. Peden, E. B. Stavely, U. Z. Asselin, J. M. Miller, J. E. C. Daoust; Delegates to the Royal Architectural Institute of Canada: R. P. LeMay, J. S. Archibald, P. E. Nobbs, J. O. Marchand, G. A. Monette, A. Chausse, L. A. Amos, and J. P. Ouellet. The next annual meeting will be held in Quebec.

Reinforced Concrete Construction—4

By Professor E. Brown, Department of Civil Engineering, McGill University, Montreal

¶ The fourth and concluding article of a special series in which Professor Brown has endeavored "to explain in as simple a manner as possible the scientific basis of our construction work, to show to what extent the main assumptions of design accord with the results of tests, and to give some numerical examples of actual design in illustration of the principles explained." Articles No. 1, 2 and 3 were published in our issues of Nov. 20, 1912; Dec. 4, 1912, and Jan. 1, 1913, respectively.

IN the third article the loading system of a typical floor unit measuring 17 ft. by 20 ft. was assumed, and the reinforcement necessary to enable the various parts of the floor system to resist bending was determined. The theoretical basis of the formulae and tables used to determine the shearing reinforcement has been explained, and the results obtained will now be applied to one of the main floor beams to illustrate the method.

Shearing Reinforcement of 20 ft. Tee Beams of Floor System

Reference to the preceding article would show that the load on each Tee beam was 2015 lb./ft., and that a beam 24-in. deep from the top of the floor slab to the steel, 12-in. wide, and reinforced with 2.31 sq. in. of steel at the centre, would carry the bending moment. The floor slab was 4¼-in. thick, so that the lever arm, kd, of the steel force $= 24 - \frac{4\frac{1}{4}}{2} = 21.87$ in. Five rods were used to give the reinforcement required.

The shearing specifications call for the bending up of some of the tension reinforcement as the ends of the beam are approached from the centre, as soon as the average shearing stress on the section determined by the formula $\frac{V}{bkd}$ (see previous article), exceeds 40 lb./sq. in.

This occurs when $V = \text{total shear} = 40 \times 12 \times 21.87$
$= 10500$ lb.

Since the shear is zero at the centre, and then increases at the rate of 2015 lb./ft., this condition requires that metal be bent up diagonally at $\frac{10500}{2015} = 5.2$ ft. from the centre.

The specifications then permit the shearing stress intensity calculated as above to rise to 60 lb./sq. in., while still being provided against by the resistance offered by the concrete itself and the diagonal bar bent up as above, without the further aid of stirrups. This provision would extend to a distance $\frac{60}{40} \times 5.2$ ft. $= 7.8$ ft. from the centre.

Beyond the latter section stirrups must be employed and their spacing must become closer as the shearing force increases. Standard specifications permit of the concrete itself being calculated to carry one-third of the total shear, when the values of the shearing stress are limited as defined in the previous article. Hence if V = total shear, the effect of 2/3 V is taken as having to be provided against by the use of stirrups, and it was shown in the last article that this necessitates provision for carrying a vertical force of $\frac{2}{3}\,\frac{Vs}{kd}$ in a length of beam s, equal to the stirrup spacing. There are two vertical legs to each stirrup and if A = area of each, and 16,000 lb./sq. in. be allowed as a tensile stress

$$2\,A \times 16000 = \frac{2}{3}\,\frac{Vs}{kd}$$

$$\text{or } A = \frac{Vs}{48000\,kd} \quad . \quad \text{———————} \quad (1)$$

This formula will give the spacing s for any assumed dimension of stirrup. and specifications demand that s be not greater than three-quarters of the depth of beam.

Stirrups for Tee Beams

Round bars ⅜-in. diameter may be used for the stirrups, since these give the desirable amount of rigidity to enable them to act as distance pieces or frames to which the main reinforcement may be wired, and thus facilitate the proper placing of the steel. The shear V = 10 x 2015 = 20150 lb. at each end of the beam, and diminishes by 2015 lb./ft. as the centre is approached. Thus, the shear at a section x ft. from the end = (20150 — 2015 x) = V.

From (1) above $s = \frac{48000\ A\,kd}{V}$, in which

A = 0.11 sq. in.; kd = 21.87 in.; and V = 2015 (10 — x) lb.

Then $s = \frac{48000 \times 0.11 \times 21.87}{2015\ (10 - x)} = \frac{57.2}{10 - x}$, a simple formula from which the spacing s (in inches) may be calculated for any section distant x feet from the end of the beam. The formula gives the following table:—

Section Distant x Feet From End of Tee Beam	Spacing of ⅜-in. dia. stirrups inches
1	6.35
2	7.15
[illegible]	[illegible]
4	9.53
5	11.50
[illegible]	[illegible]

In practice the spacing would not be varied continuously, but some few stirrups might be spaced at about 6-in. near the ends, and then the spacing might be increased approximately in accordance with the above table, using a convenient number of stirrups at each particular spacing before making a change in spacing. The diagonal bar bent up from the tension side was estimated above, to be sufficient, along with the concrete, to carry the shear up to a section 7.8 feet from the centre or 2.2 feet from the ends. Generally, stirrups would extend beyond that distance. The section 7.8 ft. from the centre was determined from a beam of 12-in. width. If this were less (and the bending reinforcement could be placed in a lesser width), then the stirrups would become necessary at a section nearer to the centre than 7.8 ft. The principle of the placing of stirrups is, however, as above, and since no re-calculation was made in the case of the bending reinforcement with a view to reduction of width of Tee beams, the figures given in that connection have been used throughout.

The 17 ft. girders being loaded at their centres (apart from their own weight), are subject to nearly the same shear at all sections. Hence the stirrup spacing will not vary as in the case of the uniformly loaded beams, since V in the formula above is almost constant. The necessary spacing of any assumed stirrup may be found in the same manner as for the 20 ft. Tee beams.

The above computations include the essential points in connection with the design of a floor system of a reinforced building, and they form the basis of the tables used in the design of such structures. As has been pointed out, the depths and widths of Tee beams may be determined by other than pure strength considerations, and the effect of changes of dimensions affecting the relative amounts of steel and concrete in the structure, cost of forms, etc., can only be determined for any given problem, when all the conditions of that problem are known. Questions of the adaptability of this or that method of construction to any particular set of conditions will arise naturally in contracting work, but do not enter into a discussion of the application of the principles of the properties of materials to any design.

Reinforced Columns

When a prism of any material suitable for resisting compression, is subjected to an axial compressive load, considerations regarding its liability to fail by lateral buckling do not arise until its length becomes fairly large in comparison with its transverse dimensions. A column of concrete 1 ft. square and 3 or 4 ft. long, for example, would fail in simple compression when axially loaded, and there would be no question of lateral buckling causing failure. But if the length of such a specimen were increased, the tendency to bend laterally would increase, and the column would have a degree of instability which would render it unfit for use in practice. If, however, a number of longitudinal steel rods be placed parallel to the axis of the column, and at a sufficient distance from the outer surface to give them an adequate bond and to provide a fireproof covering, the column becomes a practicable one. It possesses lateral stiffness, which will guard against the tendency to lateral buckling, and will enable it to resist eccentric loads. Steel rods so embedded carry a portion of the load placed on the column, but in addition they fulfil the very important function of providing that degree of lateral stiffness which a column of plain concrete lacks. That such longitudinal steel reinforcement is not subjected to a very high compressive stress is obvious if the shortening of a reinforced prism is considered. For when longitudinal rods are embedded in a column of their own length they shorten equally with the concrete in which they are embedded. The longitudinal strain is therefore the same for both steel and concrete, and since the modulus of elasticity of steel is taken as fifteen times that of concrete, there will be a steel stress intensity of fifteen times the stress intensity in the concrete. Thus if the compressive stress in the concrete reaches 500 lb./sq. in., that in the steel will only be 15 times 500 = 7,500 lb./sq. in. — a very low value for steel to carry. Broadly speaking, then, it may be said that steel so placed is not employed to its best advantage as regards direct load carrying capacity, but such reinforcement is necessary in practice (a) to give lateral stiffness to columns, (b) to carry part of the compression load, there being many cases, such as the basement columns of a high building, in which the use of concrete alone would necessitate columns of prohibitive size. Columns may be reinforced in various ways:—

(a) By placing longitudinal rods near the surface of the column and parallel to its axis.

(b) By placing bands or hoops at intervals so as to surround a core of concrete.

(c) By a combination of (a) and (b) above, the bands or hoops encircling the longitudinal rods.

(d) By embedded structural steel shapes sufficiently rigid in themselves to act as columns.

Method (d) is not strictly speaking reinforced concrete construction, but rather heavily fireproofed steel construction, and it will not be considered further.

Method (c) is that which is usually used for reinforcing the columns of high buildings, the loads in such cases being so large that a column having only longitudinal rods would have to be of great size, and would require a very heavy percentage of reinforcement. The general effect of hooping will be noted after the carrying capacity of a column reinforced by method (a) has been determined.

Column Reinforced With Longitudinal Rods Only

From 1½ to 2 inches thickness of concrete is the usual allowance made for the fireproofing of the rods, and the effective area of a column is estimated on some such basis.

Let P = total load on column in lbs.

A = effective sectional area in sq. in.

A_s = area of steel included in A.

A_c = area of concrete included in A.

f_s = stress intensity in steel = $c\,f_c$.

f_c = stress intensity in concrete.

f = unit pressure an area $A = \dfrac{P}{A}$

$p = \dfrac{A_s}{A}$ giving percentage of reinforcement.

c = ratio of moduli of elasticity, steel to concrete.

Then,

Total load $P = Af$ = load on steel + load on concrete

$$\text{i.e.}\quad Af = A_s \,.\, f_s + A_c\, f_c$$

$$\text{or}\quad f = \frac{A_s}{A}\, c\, f_c + \frac{A - A_s}{A}\,.\, f_c$$

$$f = f_c\,[c\,p + 1 - p]$$

$$f = f_c\,[1 + p\,(c - 1)\,]$$

This simple formula gives the allowable unit pressure f in a column made of concrete having a safe compressive stress f_c and reinforced with a definite amount of steel given by p.

Thus if f_c = 450 lb./sq. in. and c = 15, and if the column contains 2 per cent. of steel in the form of longitudinal rods, so that p = 0.02, the safe load per unit area of its effective area is given by

$$f = 450\,[1 + 0.02\,(15 - 1)\,] = 576 \text{ lb./sq. in.}$$

Other values of f may be found for other values of p.

The above value of f_c is that usually specified for a concrete of ultimate strength 2,000 lb./sq. in. at 28 days, i.e., for an average 1-2-4 mixture.

Example. A circular column reinforced with longitudinal rods has to carry 100,000 lb. using one per cent. reinforcement. Find its diameter, taking f_c = 450 lb./sq. in. and c = 15.

From the formula $f = f_c\,[1 + p\,(c - 1)\,]$

$$= 450\,[1 + 0.01\,(15 - 1)\,]$$

$$= 512 \text{ lb./sq. in.}$$

$$\text{The necessary area of section} = \frac{100{,}000}{512} = 195.5 \text{ sq. in.}$$

giving a diameter of 15.8 in. The fireproofing covering would have to be added to this.

The above formula obviously enables us to calculate the percentage of reinforcement for a column of given diameter, since the latter fixes the unit stress f, and hence p may be found, since f_c and c are known.

Hooped Columns

When the loads to be carried are large, reinforcement by the use of longitudinal rods only, becomes impracticable.

A very high percentage of steel becomes necessary if the dimensions of the columns are to be kept within reasonable limits, and, as mentioned above, hooped columns are generally used, i.e., columns in which there is a certain amount of longitudinal reinforcement around which are placed at intervals a number of hoops or bands. Tests have shown that the general effect of hooping is to greatly increase the lateral stiffness of a column, and to increase its ultimate strength, but it has little effect on the behaviour of the column within the limit of elasticity of the materials. When the concrete core has undergone a certain amount of deformation, however, its tendency to spread laterally is resisted by the hoops and rods which confine it, and as stated, the ultimate strength and stiffness are increased materially. The column is thus enabled to sustain a greater safe unit pressure, and the American Standard Specifications recommend the following for relative working stresses in the concrete of columns reinforced in various ways:—

(a) Columns with longitudinal reinforcement only, the unit stress recommended for safe axial compression in Chap. VII. Sect. 3 (i.e., 450 lb./sq. in. for a concrete having compressive strength of 2,000 lb./sq. in. at 28 days).

(b) Columns with reinforcement of bands or hoops as hereinafter specified, stresses 20 per cent. higher than given for (a).

(c) Columns reinforced with not less than 1 per cent. and not more than 4 per cent. longitudinal bars, and with bands or hoops, stresses 45 per cent. higher than given for (a).

The standard specifications further say, in part. that where bands or hoops are used the total amount of such reinforcement shall not be less than 1 per cent. of the volume of the enclosed column; the clear spacing of such bands or hoops shall not exceed one-fourth of the diameter of the enclosed column; adequate means shall be provided to hold the bands or hoops in place so as to form a column, the core of which shall be straight and well centered; bars composing longitudinal reinforcement shall be straight and shall have sufficient lateral support to be held securely in place until the concrete has set. The unsupported length of column shall not exceed 15 times its least width.

The above one per cent. of hooping is specified, as experiment shows that it is sufficient to enable the beneficial effects of hooping to be realized to an extent provided for in the specifications. Larger amounts of hooping would increase the ultimate strength and the possible amount of deformation before failure, but they are usually unnecessary in practice.

Calculation for Hooped Column

The foregoing abstract from the Standard Specifications states that for hooped columns a value of f_c, 45 per cent. in excess of that used for the concrete in columns having longitudinal bars only, may be used. Hence f_c for columns hooped as specified is 1.45 x 450 = 650 lb./sq. in.

Thus, if a column be required to carry 385,000 lb., and 2 per cent. of longitudinal reinforcement is used, the allowable unit load becomes

$$f_c [1 + (n - 1) p] = 650 [1 + 14 \times 0.02] = 818 \text{ lb./sq. in.}$$

This requires an effective area of $\frac{385{,}000}{818} = 471$ sq. in. or a diameter, within the hooping, of 24.5 in. Allowing 2 in. for protective covering, the outer diameter of the column would be about 28.5 inches. In addition to the above 2 per cent. of longitudinal reinforcement, 1 per cent. of hooping must be used in accordance with the above increase of f_c. This means that the volume of steel in the hoops encircling any given length of column, must be 1 per cent. of the enclosed volume of concrete. Thus in a length of 10 in. there must be 1 per cent. of (10 × 471) cubic inches = 47.1 cu. in. If there are four hoops in every 10 inches each hoop must have a volume $\frac{47.1}{4} = 11.8$ cu. in. and since the length of each is about 77.2 in., the necessary diameter will be about 7/16 in.

Different percentages of longitudinal reinforcement might be adopted within the limits of 1 and 4 per cent. imposed by the specifications, and corresponding to each there would result some definite column diameter and hooping. The cost of each could be determined from the amount of concrete, steel, form work, etc., involved, and thus an economical and properly designed column could be selected. In the case of basement and lower floor columns carrying very heavy loads, the diameters of columns may be limited by space considerations, and thus the unit load on the columns would be known, and the necessary amount of reinforcement would be determined from the formula used above. Should the reinforcement so calculated fall outside the limit of 4 per cent. set by the above specification, special means must be adopted to meet the unusually severe conditions imposed. The allowable stress $f_c = 450$ is taken to be 22.5 per cent. of the ultimate strength of the concrete at 28 days, and the use of a richer mixture would justify an increase in f_c. This would reduce the diameter of the column for any given load, below the dimensions given above. Such increase of f_c should, however, only be made after experiment upon the aggregate used, or from definite knowledge of the compressive strength of concrete made from similar aggregates under similar conditions. The standard specifications, however, cover the cases which are likely to arise in ordinary practice, and any departures therefrom must be specially considered. The American Standard Specifications allow of the use of a higher value of f_c than 450 lb./sq. in. under proper conditions, but they limit the allowable increase to 25 per cent. The danger which might arise from allowing too high a value of f_c to be figured in designing, is too obvious to need emphasis.

Load on Columns of Building

In estimating the load carried by the columns in a building it is usual to make some allowance for the fact that it is extremely improbable that the floor unit surrounding any one column will be fully loaded at one and the same time at all floors of a building. Such allowances must depend somewhat upon the type of building, since it is obvious that factory conditions must differ from those of a large store.

The New York Building Code allows a reduction of 5 per cent. to be made in the live load at each floor, starting from the top and proceeding downwards, until a maximum reduction of 50 per cent. has been attained. Below that, the column loads must be increased floor by floor so far as live load is concerned, by the constant amount of 50 per cent. of that live load. Thus if the live load were 100 lb./sq. ft., the topmost section of the columns of the building would have to be designed to carry the roof load; the next section to carry in addition, the dead load of one floor unit, plus 100 lb./sq. ft. live load; the next section to take the load of the section above, plus the dead load of another floor, and a live load of 95 lb./sq. ft.; and so on. The live load allowance would be decreased 5 lb./sq. ft. at each floor down to a minimum value of 50 lb./sq. ft.

If the floor unit designed in these articles be part of a building of eight floors including the ground floor, and the above reduction be applied, the ground floor live load carried to columns may be reduced to 65 per cent. of its total value, the percentages for the various floors increasing by stages of 5 per cent. at each floor up to 100 per cent. for the top floor. This gives a total live load on [illegible]

[illegible] the live load per floor unit i.e., 6.6 × [illegible] lb. The dead load would be 8 × 45,000 — [illegible] lb. Allowing, say, [illegible] lb. for the roof, this would give a total of 660,000 lb. per column.

(a) With 2 per cent. longitudinal reinforcement and 1 per cent. hooping, the safe unit pressure would be

$$f = 650 [1 + (15 - 1) 0.02] = 832 \text{ lb. sq. in.}$$

in accordance with the formula above. Hence an area of

$$\frac{660{,}000}{832} = 793 \text{ sq. in.}$$

or a diameter of 31.8 in., say 32 in., inside the hoops would be required. Longitudinal rods would have to be provided giving a gross area of 2 per cent. of 793 sq. in.—say 16 sq. in. The hooping of 1 per cent. is equivalent to an additional 8 sq. in. when estimating the total amount of steel involved. The gross section of the column would be 1,020 sq. in. (taking the outside diameter at 36 in.), and the total steel is equivalent to 24 sq. in.

(b) Using 3 per cent longitudinal reinforcement and 1 per cent. hooping the safe unit pressure becomes 922 lb./sq. in., necessitating 716 sq. in. or 30 in. diameter inside the hoops. The gross area of longitudinal rods = 3 per cent. of 716 = 21.5 sq. in. and 1 per cent. hooping is equivalent to an additional 7.2 sq. in. making a total steel equivalent 28.7 sq. in. Taking the outer diameter of column as 34 in. the gross section is 906 sq. in.

Comparison of these results shows that (a) requires more concrete and less steel than (b), and the relative cost of concrete, steel, forms, etc., and questions of restriction of column dimensions would then arise as considerations apart from design. Suitable dimensions can only be determined in any given case in the light of all the circumstances. If higher values of f_c be taken the diameter could be reduced.

The writer has endeavored in this series of articles to explain the application of simple fundamental principles to the design of a structure of a type which is now very common in all Canadian cities of fair size. The American Standard Specifications have been quoted where necessary, as they embody the results of a careful study of all the known conditions affecting the use of reinforced concrete, and the writer would urge strongly that standard specifications be adopted for use in this country. Especially would he deprecate the making of trivial and unimportant changes in such specifications as those quoted, and the adopting of such modified specifications as being more suited to this country than other specifications already in existence, and of proved value. The building by-laws in many cities in Canada regarding the use of reinforced concrete are either foolishly restrictive or insufficiently restrictive, and it is time that the specifications issued by those responsible for the erection of many of our large buildings were brought into line with the findings of responsible and representative bodies which have investigated the matters involved. Some specifications which have come to the writer's notice have betrayed a colossal ignorance of what is suitable for the conditions with which they pretended to deal, and it would be far better to have a set of standard specifications to which the designer must conform, than to allow him the almost unlimited license which many specifications now issued compel him to take. The work of the designer, and of the contractor, should alike be the subject of careful supervision, under a rational system of by-laws, and in the writer's opinion little would then be heard of so-called "reinforced concrete" failures.

Work has been started on the permanent concrete foundations for the new power house and machine shops, to be used in connection with the $3,000,000 dry dock at Prince Rupert, B.C., the bonds for which are being guaranteed by the Dominion Government. It will be built in three sections, with a lifting capacity of 20,000 tons. These sections may be used separately or together, as the size of the vessel being repaired demands, or in the case of one section requiring attention, boats can be docked in the other parts. Twelve pontoons are to be constructed in a proposed shipyard, near the dry dock.

Canadian Railroad Development

It is stated that the Grand Trunk Railway will spend a great sum on improvements and extensions in London this year.

The Windsor, Essex & Lake Shore Rapid Railway Company, Kingsville, Ont., is considering extending its traction line to London, Ont.

Mr. David Crombie has recently been apointed general superintendent of transportation, and Mr. W. F. Farrell, superintendent of freight service on the Grand Trunk Railway.

The proposition of a railway to Hudson's Bay with Port Nelson as its objective point, financed by Winnipeg men, is taking definite shape. The road is to run from Winnipeg to a point on the Winnipeg river just east of its confluence with Lake Winnipeg, thence in a direct line to Port Nelson on the Hudson Bay.

A railway from Cochrane, Ont., across the great new hinterland of Quebec, to Cape St. Lewis, in Labrador, with branches to the mouth of the Hamilton river and to the city of Quebec, is projected. The Canadian Central and Labrador Railway Company has given notice of application to Parliament this session for a charter for the undertaking.

The Canada & Gulf Terminal R. R. projects a 223-mile line from Ste. Flavie on the Intercolonial R. R. to Gaspe Bay at the end of Gaspe Peninsula, where a port open all the year round is to be created. The road is already in operation from Ste. Flavie to a point beyond Matane, and construction, it is said, is being rushed towards the new terminal.

It is expected that final arrangements will be made shortly between the Kettle Valley Railway and the Victoria, Vancouver & Eastern Railway (Hill Line), regarding the construction and joint operation of the Hope Mountain Division. This section will be about 50 miles long and will call for expensive construction, as it is almost wholly mountain rock work.

Construction work on the Lulu Island branch of the Canadian Northern Pacific Railway will be proceeded with immediately, and a contract for the first ten-mile section has been awarded to the Northern Construction Company, the operations to be completed by June 1st. The new line will run north and south across Lulu Island at the eastern end and then follow the bank of the South Arm of the Fraser River to Steveston.

The North Railway Company will ask Parliament to confirm the rights and privileges which it is now entitled to under provincial incorporation. The company will ask for power to extend the lines of railway, which it is now authorized to construct from its main line to Ottawa from Montreal to Quebec and from Montreal to the boundaries of Maine, New Hampshire and Vermont, with power to construct a bridge across or a tunnel under the St. Lawrence River.

The Athabasca & Grande Prairie Railway Company is to apply to Parliament for an act of incorporation. This company proposes to construct a line from some point at or near the junction of the Salmon and Athabasca River in the Province of Alberta to run in a northwesterly direction to a point at or near the junction of the Smokey and the Muskeg rivers, thence by the most feasible route in a northerly direction to Dunvegan, passing through Grande Prairie at a point on the westerly side of Bear Lake.

Important Programme for New Brunswick

Undertakings Which Will Write 1913 Large in the History of the Maritime Province — Great Expenditure Involved

Correspondence of the Contract Record

St. John, N.B., January 15th.—There will be a great deal of heavy construction work in the Province of New Brunswick this year. At St. John, work will be prosecuted on a larger scale than last year in constructing the great dry dock and breakwater at Courtney Bay, while extensive dredging operations will also be carried on there. At West St. John, wharf building and the erection of the new C.P.R. elevator will be continued. At the extreme south end of the peninsula, between east and west St. John, the city will reclaim from the tide an area of 50 acres or more as a site for new industries, and at least two of these are ready to assemble their plant as soon as the site is ready. There will also be the erection of the great bridge between east and west St. John, and it is believed that several new industries will be established, while ordinary building operations will be on a much larger scale than that of last year, which showed an increase of more than 50 per cent. over the previous year.

The New Brunswick Hydro-Electric Company, which proposes to transmit power from water powers which it controls to the city of St. John, is expected to do considerable development work this year. At Grand Falls the Grand Falls Power Company, of which Sir Wm. Van Horne is the head, will begin development work, which will eventually involve an expenditure of millions of dollars, and is expected to include the erection of pulp and paper mills. The Partington Pulp mill at St. John will have its capacity increased 50 per cent. this year, and the company is also considering the erection of a smaller pulp mill at Marysville.

Heavy Railroad Work

The construction of the St. John Valley Railway will be continued, and will involve considerable heavy construction work. Bridge work of a very heavy character will be necessary on the section nearest St. John, but the route of this portion has not been fully decided, although such a decision must be made very soon. In any route chosen there must be heavy expenditure for bridges. Until mid-summer there will be great activity also on the Gibson and Minto branch, which will connect the coal mines of Queens County with the Canadian Pacific Railway system, and lead to a very large increase in mining by several companies, at the head of one of which is Sir Thomas Tait. There was a rumor last week that the company headed by Senator Domville, which owns very valuable deposits of oil shales in Albert County, had sold out to representatives of the British Admiralty for ten million dollars; but, whether there is any foundation for this statement or not, the MacKenzie and Mann interests will continue the development work on their areas which was carried on to a considerable extent last year. A director of the Company which controls the natural gas wells in Albert County, says that gas will be piped from the wells to St. John during the present [illegible] perhaps not fully warranted as yet.

Work will be begun in the spring on the new sugar refinery at St. John, which is to cost between two and a-half and three million dollars.

It is expected that the New Brunswick and Maine Legislatures will endorse the erection of an international bridge at St. Leonard's on the upper St. John River, to connect the railway systems of that part of the province with those of Maine.

It is confidently predicted on all hands that building operations generally in the cities and towns of the province will be active this year, and that the province will add a considerable number of new industries, as well as see the development of new resources.

A course of lectures was started at the City Hall, Toronto, on January 8th, by the Institute of Sanitary Instruction, Department of Health, Toronto. These lectures are for the special benefit of sanitary inspectors, but are also open to the public. Dr. Hastings, medical officer of health, Toronto, gave an interesting opening address on the necessary qualifications for a sanitary inspector and also mentioned how the need of effective sanitation was being recognized by the general public more and more every day. These lectures will be continued every second Wednesday until April 30th, and a distinguished list of lectures has been arranged for.

At the meeting of Section D, Engineering, on Friday, January 3rd, a programme of thirty papers devoted to Highway Engineering and related subjects occupied the morning and afternoon sessions. The titles of the papers and authors have been published in a previous issue of this journal. The sessions were presided over by Professor Arthur H. Blanchard, as Chairman, and Professor George W. Bissell, as Secretary. On Saturday, January 4th, many of the engineers in attendance visited the plant of The Deckman-Duty Company at which Dunn wire-cut-lug paving brick are manufactured. The inspection trip of the morning, which was made in automobiles, also included the examination of various sections of brick and stone block pavements in Cleveland. The tour of inspection was made through the courtesy of Mr. F. B. Dunn and the officials of The Deckman-Duty Company and the National Paving Brick Manufacturers' Association, who, on the preceding evening, entertained many of the engineers present at a dinner given at the Cleveland Athletic Club.

Mr. J. G. Lindsay, City Engineer of Belleville, Ontario, reports trade conditions excellent in that city. A number of important undertakings are projected. These include a new government dock, estimated to cost $250,000; a sewerage scheme, $250,000; sidewalk construction, $120,000, and waterworks extensions, $25,000. The outlook is bright for Belleville. With the C. P. R. in operation and six new industries locating in the city it is expected that there will be quite a boom in the building trades this year. Belleville is the largest city on the main line between Toronto and Montreal. It is served by three transcontinental lines, the G. T. R., the C. P. R. and C. N. R., and has direct transportation by water to Fort William and points west.

During the past year the following rolling stock was ordered by the Grand Trunk and Grand Trunk Pacific:—Grand Trunk: Cars:—5,000 box, 1,000 hopper coal, 500 automobile, 500 refrigerator, 50 tank. Locomotives:—60 Pacific, [illegible] Switchers, [illegible] Mikados. Grand Trunk Pacific: Cars:—[illegible] box, [illegible] dump. Locomotives:—[illegible] Consolidated. Central Vermont: Cars:—100 box, 200 hopper coal. This makes a total of 8,850 cars and 140 locomotives.

Effect of Cuts in Newly-Paved Streets

Life of Pavement Greatly Decreased — Remedial Suggestions and their Practicability — A Fairly Satisfactory Method Outlined

By James E. Barlow*

IT is a matter of common observation to you all that an opening repaired is never as good as the original undisturbed pavement. In addition to the general disturbance of the subsoil there is usually left a slight hummock or a slight depression in the pavement which the pounding of traffic accentuates, causing a more or less endless chain of repairs. Eminent authorities have estimated that in some cities the useful life of the pavement is decreased 25 per cent. by these cuts. The reduction in the life of the pavement in a city such as Cincinnati is probably not as great as this, but nevertheless, the damage is very real. Some idea of this damage in dollars and cents may be had when one realizes that the cost of pavements, including maintenance, interest and renewals in a modern city like Cincinnati, exceeds $2,000,000 per year, that is, if our pavements were laid and maintained by a public service corporation, a fair annual rental would exceed the figure mentioned. Now, aside from shortening the life of the pavement, these openings cause danger and annoyance to traffic, wear and tear to vehicles; they render cleaning more difficult, they are unsightly in themselves until repaired and they are costly to restore and they later become the source of additional repairs. Thus the importance of properly controlling such openings and reducing them to a minimum is readily seen.

As a complete solution of this problem some have suggested subways or pipe galleries under the streets with laterals to property lines. Others have suggested subways under the sidewalks, necessitating double lines of mains. However, the investments tied up in the present form of underground construction, the enormous expense necessary for subways and the fact that much of the sidewalk space where subways are most needed is used privately for buildings as areaways, all tend to throw this solution, for most cities, into the somewhat distant future. The problem thus becomes one of the best controlling the present cuts and reducing the number to a minimum.

Current Practice at Cincinnati.

Probably the best way to bring the subject to a focus would be to outline briefly the manner in which this problem of cuts and their restoration is handled in this city.

When a street is to be improved notices of the two final steps in the legislation are sent to all the public service corporations, and again when bids are received, and again when the contractor is ordered to begin work. The object of these notices, of course, is to keep the companies informed of the status of the proposed improvement and allow them ample time to plan repairs, renewals or extensions. At the outset, however, it may as well be admitted that the franchises of these local public service corporations are such that we have little or no control over what they shall do along these lines.

As an additional lever, early this year a city ordinance as passed which virtually prevents any opening in a newly laid pavement for a period of three years, except in regular emergencies. Notices calling attention to this ordinance are sent to all public service corporations and to property holders about three months before the actual work of construction begins.

The topography of Cincinnati is such that often the heavy cuts and fills practically prohibit the laying of mains until the street is graded. On all contracts now let, if the street does not already contain water and sewer mains, they are included in the street improvement contract. We only wish we might include gas in the same way.

To prevent, in so far as possible, openings for house connections, we are now serving notices on all property owners along a proposed improvement to make water and sewer connections to their lots, whether occupied or vacant. If these are not made in 20 days, the city makes such connections to the curb line and assesses the cost thereof against the individual property. This calls forth considerable objection, but it must be borne in mind that half the owners gladly make all connections and it is only just that we should take such steps to prevent the other half from damaging the pavement.

The preceding may all be classed as preventive measures. There is also to be considered the proper control and restoration of the necessary openings.

An important step in an intelligent control of street openings is to know what you have under the pavements and where these structures are. This primary information is not always in the hands of cities. In connection with an investigation for a comprehensive sewer layout, a complete underground survey is being made to locate all the subsurface structures. These plots will be made on a scale of 40 and 50 feet to the inch. There will be possibly 1,000 sheets, 24 by 34 inches, in the complete set. When compiled these will be kept up-to-date as a basis for our underground records and we can then more intelligently direct future underground construction.

There is, of course, also to be considered the actual making of the restorations. Several years ago a city ordinance was passed making it unlawful for any person other than the Street Repair Department to open any pavement without a permit therefor. This ordinance further provided that the application for this permit should state the location and size of the opening and the kind of pavement. Before the permit is issued a deposit is required, based on the published sliding scale of prices for the restoration of different sized openings in the various kinds of pavements. No persons other than the employees of the Street Repair Department are allowed to permanently restore these openings.

The party making the opening does the backfilling and makes a temporary restoration of the pavement; if the backfilling is not properly done the Street Repair Department will do the work over and bill the cost to the party responsible.

The Street Repair Department handles the issuing of all permits and, of course, makes all rules in accordance with which such openings can be made. The control of the openings and the responsibility for their speedy and adequate restoration is thus controlled.

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* Assistant City Engineer, Cincinnati, Ohio.

This outlines the principal steps taken here to control street openings. Some of these measures cause much friction and delay, especially those involving serving of legal notices which require definite periods of time before action can be taken. However, we feel that the end justifies the means.

Density of Population and Its Relation to the Design of Municipal Works

KNOWLEDGE of the density of population in cities is frequently a matter of considerable importance, especially in connection with designing plans for sewerage, water supply and refuse collection, says the Municipal Journal. Not only is the present density to be considered, but the probable future maximum in any given area must generally be estimated or assumed. Unfortunately, data concerning density are not often available. When such data are needed, the present densities of certain city blocks assumed as representative are determined by actually taking a census of each and comparing this with the measured area. But this tells little concerning probabilities of increased density, for determining which past densities are desirable. Possibly the most practicable method is to find, if possible, a block in the city in question (or in some city which has already attained the size and individual and residential conditions which are anticipated for the city in question), which may be considered as having the maximum density for each class of residential areas, and ascertain by actual count the density on such block.

One of the difficulties in studying population densities is the fact that such figures as are given are generally the densities of the entire municipal area—that is, the total population divided by the total area within corporate limits; and this is seldom of any value either by itself or in comparison with other cities, owing to the greatly different conditions in the various cities as to inclusion of unpopulated areas within the city limits. The only figures of real value would be those obtained by dividing the city into several districts, such as, business, mixed business and residential, dense residential, suburban residential and farming, and obtaining densities for each. In smaller cities it may be advisable to eliminate one or two of these classes, in larger cities to add one or two different classifications.

A much more common method than the above, where there is any attempt at ascertaining density of subdivisions, is to obtain the density by wards. This is by no means as logical or as useful as employing areas classified according to residential conditions; but it is much more useful than general city averages, in that by a combination of wards an approximation to such classification may be obtained.

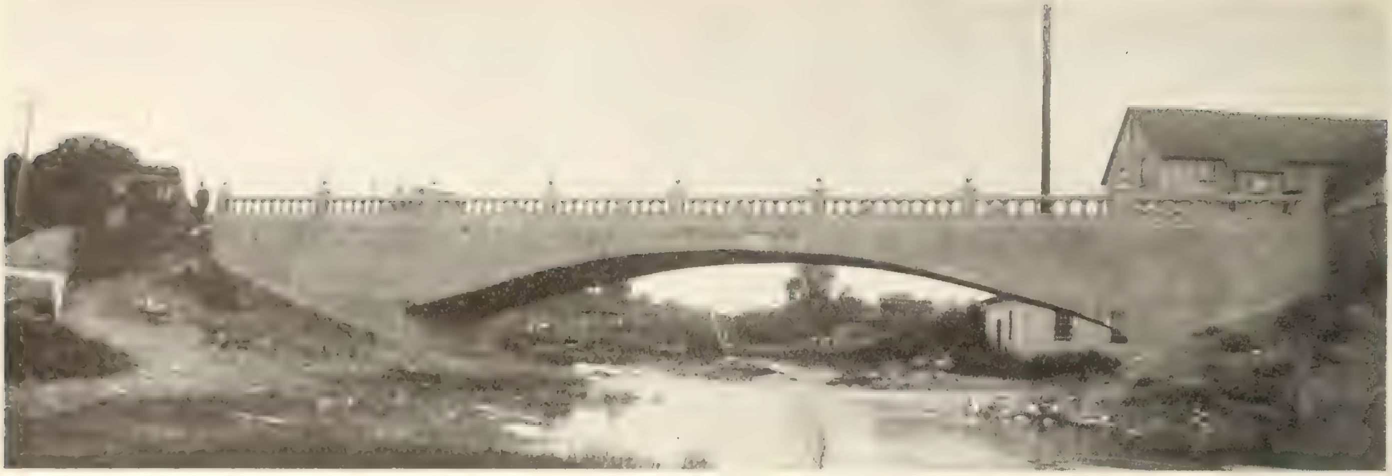
An excellent illustration of how various may be the densities in the several parts of the same city is afforded by the city of New York. In the first place taking only the five boroughs, each of which has its own characteristics, we find the average densities to be as follows: Manhattan, 176.3; Bronx, 16.2; Brooklyn, 41.9; Queens, 3.5 and Richmond, 2.3. Here we find one borough of the city having about eighty times as great average population per acre as another part of the same city. If we consider the population by wards we find a much greater difference. One ward of the borough of Richmond has a population of 1 per cent., while one of the wards of Manhattan has a population of 696.7 per acre.

This is, of course, an extreme case, since Greater New York is really the combination of five different cities. If we take any one of these, however, we still find great differences in density. In Manhattan alone the figures range from 11.5 per acre to 696.7 per acre; the former being in the business district and probably containing a temporary day population of 1,000 or more per acre. In Brooklyn the minimum figure is 3.12 per acre, the maximum figure 278.7; the minimum in this case being in a sparsely settled suburban area. This description might be applied to almost all of the borough of Queens except ward 1, where the population is 13.3, the other wards varying from 1.7 to 7.2. In the borough of Richmond, also, if we exclude the first ward with a population of 8.1, we have a limited variation of from 1 to 4.1. In these latter cases each ward is really the size of a small city and contains much land not built upon.

Density per acre of any city area is affected to a considerable degree by the width of streets, areas devoted to parks, etc. Thus, certain cities have almost as much of their total area in streets and parks as they have in land occupied with buildings of any kind, while in other cities such area constitutes only 25 or 30 per cent. of the whole. In determining densities, the population of a given area is divided by the total area, including streets and parks, and consequently the relative amount of the latter plays an important part in determining the averages.

The science of city planning and the guidance of city development is yet in its infancy, most cities in this country having up to this time been merely permitted to grow haphazard or according to the wishes of some selfish individuals or corporations. The time is rapidly approaching when the present and future condition of cities will be studied with a view to improving the welfare of the people as a whole and realizing the maximum possibilities of co-operation; and one of the important elements of this study will be an investigation of the reasons for, and methods for preventing, unsanitary and otherwise objectionable congestion of population.

The reinforced concerte beater tubs which are being built by the Aberthaw Construction Company, at Boston, in the new reinforced concrete buildings of the Milton Leatherboard Company, Milton, N.H., are the first beater tubs to be made of the modern structural material. Generally, beater tubs have been made of wood and lined. The proposed beater tubs are four in number, and have overall dimensions, 26 feet 8 inches long by 13 feet 2 inches wide, making them larger than any wooden tubs which have heretofore been built. It is stated that the adoption of reinforced concrete for this purpose will have many decided advantage, and the results obtained with this material will be looked forward to with interest.



Reinforced Concrete Arch at Embro, Ont.

THE bridge seen in the accompanying illustration is 120 feet long and has a clear span of 75 feet, with a roadway 18 feet wide. The arch is reinforced with 1½-inch twisted bars, of which there are thirty-six runs throughout extending into the abutments to a distance of six feet, with ¾-inch bars placed crosswise every three feet. The concrete in the abutments and wings is 7:1 and in the arch 3:1. The centre of the arch is 21 feet above low-water mark.

No crushed stone was used in the construction, as gravel was available at a distance of about one-half mile from the bridge site. About 640 barrels of cement were required. The arch was constructed by using double inch-boards of spruce, 10 feet long, underpinned with timber every five feet. The spindles and posts for the railing were moulded to the bridge site. The under supports of the bridge were left under the structure for four weeks after completion.

The arch, which was built for the village of Embro, was designed by Mr. F. J. Ure, of Woodstock, and built by Messrs. Bain & Ross, of Embro. Hanover cement supplied by Messrs. Alfred Rogers, Limited, Toronto, was used.

Maximum Stresses in Rivetted Steel Columns

IN a recent paper before the Western Society of Engineers Prof. O. H. Basquin, professor of applied mechanics at Northwestern University, presented a somewhat elaborate discussion of stresses in columns intended to show the effect of principal secondary stresses in the maximum stresses likely to be produced in riveted steel columns. He gave diagrams and results of numerous column tests and deduced formulae for stresses and deflections of eccentrically loaded columns.

Bends and Eccentric Loads.

It is stated that commercial columns 30 feet long, fabricated under the best conditions, seldom have less than ¼-in. kink or bend, and a formula is given for the deflection, under central load, of initially bent columns. As the deflection is slightly smaller than that of a straight column carrying an eccentric load, it is considered better to regard a bend in a column as an eccentricity in a straight column. From a series of tests with eccentric loads on straight columns it appears probable that few columns are likely to have an accidental eccentricity exceeding 0.75 in. There are indications that the accidental eccentric ratio of a column is likely to be somewhat larger than 0.20 in. in the plane perpendicular to the pin, and much larger in the plane parallel to the pin, thus indicating that it is much more difficult to obtain any desired distribution of the column leads in the plane of the pins than to attain it in the plane at right angles to the pins.

It is suggested that specifications are inexact regarding bends and twists in columns, and that it is desirable to establish a limit of crookedness of, say, 1/16 in. in 5 ft. of length.

Variations in Centre of Gravity and Elastic Limit

The centre of gravity of a column may be displaced by variations in the weight of the pieces of steel which compose it. The maximum displacement will be obtained by assuming all parts on one side of an axis to be 2½ per cent. too heavy and all other parts 2½ per cent. too light. In this case the center of gravity will be displaced about 2½ per cent. of the distance between the centres of gravity of the two halves of the column. In channel columns the offset will be small in the plane parallel to the web, but in I-beam columns it will be greatest in that plane.

Varying Elastic Limit

If the different parts of a column section have different coefficients of elasticity, this vibration may be such as to displace the effective center of gravity with respect to the geometrical center of gravity. The effect on the stress is comparatively small if the column section is divided by the gravity of axis into two portions in each of which the coefficient of elasticity is practically constant, although different from that of the other portion. The effect upon the stress is considerable if, in the portion of the section which has a low average value for its coefficient, there happens to be a small area far removed from the axis whose coefficient is not low.

In many cases a column load is eccentric because the ends of the columns do not come to a good bearing over their entire areas until the load has reached a considerable value. In a column made up of two 10-in. channels weighing 15 lb. per foot, latticed 6 in. apart back to back, with a slenderness ratio of 70, if the pinhole is not quite square with the bearings a case is considered where the column will come to a good bearing when the load reaches about 160,000 lb. per square inch. That is, a load of 1,600 lb. per square inch is required for every 0.01 in. error in the pinholes. The extra stress, due to bending alone, is over 2,000 lb. per square inch for every 0.01 in. error in the pinholes, making a maximum unit stress of about 3,600 lb. per square foot for each 0.01 in. error.

Pins rolling in their bearings always decrease the initial eccentricity. If there is a close fit between the pins and their pinholes the decrease in eccentricity is very considerable, especially for slender columns under large loads. Pin friction is a possible source of initial eccentricity which becomes smaller with increase of load.

Safe Stresses

In designing columns it is suggested that:

(1) The stress due to fabrication should be estimated and subtracted from the tensile yield point of the material giving elastic stress of the column.

(2) The excess ratio e d/r^2, due to local eccentricity in one rib of the column should be estimated. In this formula e is the departure from a straight line, d is the distance of the most stressed fiber from the gravity axis of the single rib, and r is the radius of gyration on the single rib. The maximum elastic stress of the column, divided by $[1 + (ed/r^2)]$, will give a dangerous maximum unit stress. It will be appropriate to adopt standard dangerous maximum stresses for the various types of columns in general use.

(3) For each of the two planes of the column an eccentricity should be selected which, in the opinion of the designer, will surely not be exceeded in the column. By the use of these eccentricities a dangerous average stress may be found, such that the maximum unit stress given by this equation equals the dangerous maximum unit stress above defined.

(4) The safe average stress may be found by dividing the dangerous average stress by the factor of safety.

Consideration is given to stresses produced in lattice bars by the fabrication of the column, by transverse shear caused by local bends in the columns, and by transverse shear caused by general inclination of the column. These considerations are of greatest importance for columns of large dimensions. Those of ordinary dimensions probably receive their maximum shear during fabrication, transportation or erection.

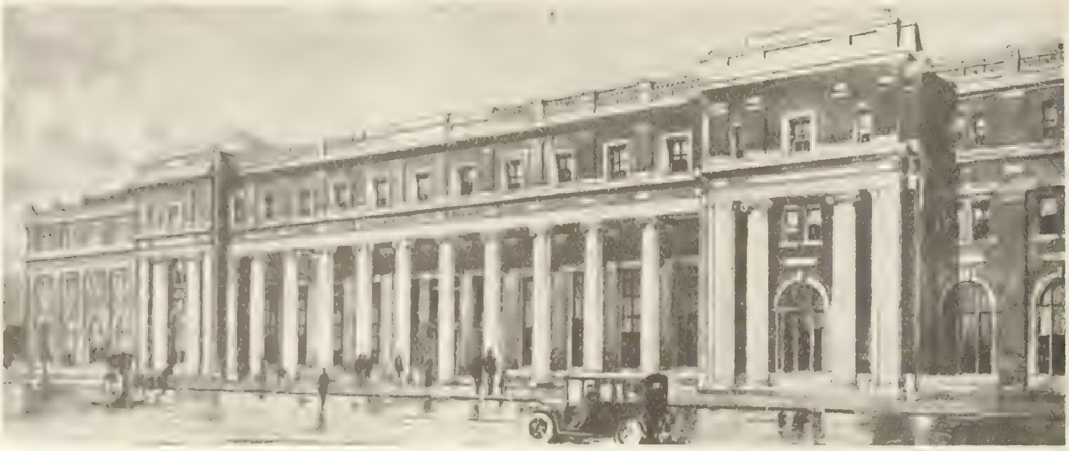
In conclusion, it is noted that the actual maximum stress present in a column under load is a function of the imperfections of the column, both with respect to its manufacture and with respect to the manner of loading. The engineering profession should face these imperfections squarely, information regarding the imperfections should be sought diligently, and columns should be designed with some reference to the maximum values of such imperfections, not of columns as a whole, but either of individual columns or of types of columns.

A railroad of many tunnels, aggregating one-fifth of the total length of the line, has been opened by the Paris-Lyons-Mediterranean Company from Morez to Sainte-Claude, in the French Alps. The line, in a total length of about 24 kilometers, has eighteen tunnels, representing about 20 per cent. of the entire length, the longest being 1,750 meters long. There are also nine viaducts, the longest having nine 20-meter spans. The estimated cost for the single-track lines is approximately $200,000 per mile.

The new foot tunnel which has been built to connect North and South Woolwich, was opened recently. The tunnel, which was designed by and the work executed under the supervision of Sir Maurice Fitzmaurice (a contributor to this journal), consists of a cast-iron tube of 12 ft. 8 in. outside diameter, connecting two vertical shafts of 25 ft. inside diameter and about 60 ft. deep. The length between the shafts is 1,635 feet. The thickness of the river bed between the top of the tunnel and the river is about 10 feet at the deepest place. The shafts consist of steel caissons formed of two skins of steel plating, the annular space between them being filled with concrete. Both shafts were sunk by excavating inside them under compressed air. They are lined with brickwork, and in each there is a spiral steel staircase giving access to the tunnel from the street above. In the well of each staircase there is an electric lift capable of carrying forty passengers. The tunnel was constructed by the shield method under compressed air. After it was completed from shaft to shaft it was lined throughout with concrete, upon which white glazed tiles are fixed. The footway is paved with York stone flags. The tender of the contractors, Messrs. Walter Scott & Middleton, amounted to $394,300, but the original scheme did not include the provision of lifts, which were afterwards added at an extra cost of $25,000. Some excellent tiling in the subway has been executed by the Newellite Glass Tile Company, Old Kent Road, S.E.

Reinforced concrete retaining walls, 1,680 feet long and 30 feet high, with buttresses spaced 20 feet on centers, are a feature of the fore-shore protection work at Dallas Road, Victoria, B.C., being carried on by the Public Works Department of that province. The reinforcement in the wall section consists of horizontal link-jointed rods kept in place between counterforts by 4-inch washers, ⅜-inch thick, placed 6 feet 8 inches apart. Additional reinforcement is furnished by expanded metal and wire mesh wired to these horizontal rods. The counterforts are similarly reinforced. A belt of granite protects the face of the wall from the wash of the sea and battering by drift logs, and at the back of the wall there is a layer of broken rock about 1 foot thick to facilitate drainage.

Oxy-acetylene welding of high-pressure gas mains has been accomplished in laying a 6-inch line in San Francisco, Cal. The pipe was welded in sections about 500 feet long, the welding being done at several points at once. To insure against the possibility of the weld not extending through the entire thickness of the pipe, the ends of the lengths to be welded were left about ⅛-inch apart and the operator worked with a rod of 3-16-inch Norway iron in his left hand. This iron is melted into the joint to fill up the gap and also to build up the metal around the joint. It has been reported that many of the welds proved to be stronger than the pipe itself.



C. P. R. Terminal Station, Vancouver, as it will appear upon completion

The C. P. R. Terminal Station at Vancouver, B. C., now Under Construction

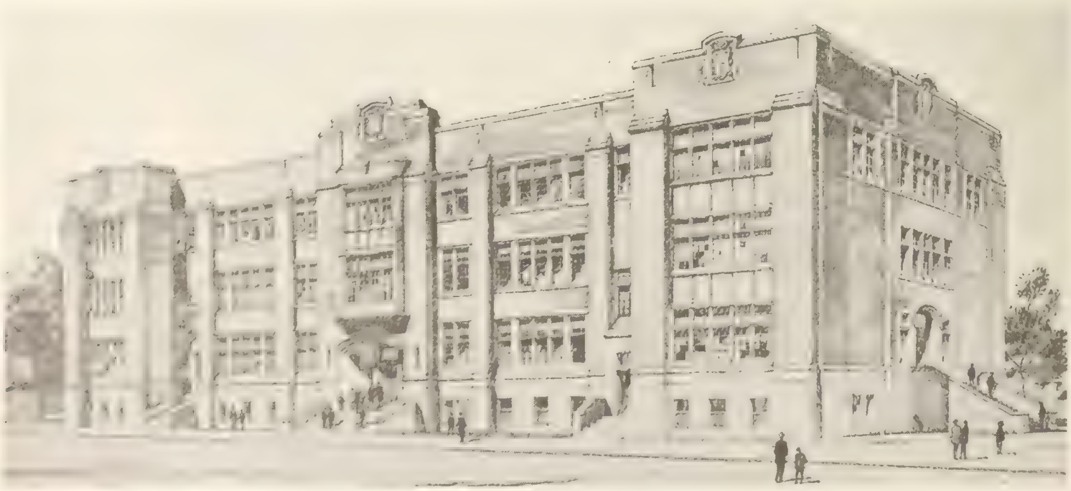
Messrs. Barott, Blackader, and Webster, architects, of Montreal, have designed plans for the new terminal station which the C.P.R. are erecting in Vancouver, B.C. The company are doing a large amount of work in the city, for in addition to the station, a new hotel is being constructed at a cost of $2,000,000. The directors have made an appropriation of about $1,250,000 for the station, which will adjoin the present building at the end of Granville street. The cut shows the facade on Cordova street.

The work has already started, and the excavation and foundations are well under way, the contractors, Messrs. Westinghouse, Church, Kerr and Company, rushing the work with the greatest speed possible. The new building will be four storeys in height, and extend four hundred feet on Cordova street. The building will be of an imposing character, the exterior being of brick and limestone with a granite base.

In the designing of this new terminal the comfort of the passengers has been considered from every point of view, and when completed it will be one of the most up-to-date in the world. The main waiting room will be 54 feet 10 inches wide and 210 feet 6 inches long, with an Ionic pilaster treatment and a coffered ceiling. The sub-waiting and lunch rooms will be of simple design in harmony with the main waiting room, and these rooms, in conjunction with the ticket offices. baggage, and parcel rooms, are conveniently arranged for the use of the public. The upper floors are to be set aside for the officials and staff of the company as operating offices. The general design of the building is of classic type and well adapted for station requirements.

Proposed School Building, Westmount Park

PLANS are now in preparation for the erection, next summer, of a school building for the Board of School Commissioners on the south side of Westmount Park, P.Q., on a portion of a recently acquired property for park extension. The exterior illustrates a type of architecture well suited to the purpose, and permits of large window areas, thus making it possible to obtain the maximum of light demanded by the best authorities. The building will be a fine addition to the school architecture of the city. The outside walls will be faced with selected brick and



Proposed Building for the Westmount School Commissioners. Architect, Mr. David H. MacFarlane, Montreal light grey limestone dressings over a base of Montreal grey limestone. The windows are to be metal casement and the construction throughout will be fireproof. The two interior stairways will be so built as to act as isolated fire escapes in case of need.

The main entrance will face towards Western avenue, and there will also be entrances at the East and West ends. The main entrance will lead to a corridor extending East and West, and connecting the side entrances for boys and girls respectively; similar corridors are to be provided on the upper floors. A feature will be a large auditorium or assembly hall, to seat 600 people, which will be immediately opposite the main entrance on the ground floor. A stage and ante-room are arranged for. On the same floor there will be seven classrooms, the commissioners' board room, principal's office, etc. On the second floor there will be eight classrooms, teachers' common room, and off the common room on either side ante-rooms for men and women teachers. Provision is made on the third floor for six classrooms, a chemical laboratory, and a physical laboratory. On each floor lavatory and toilet accommodation will be provided. Each classroom will have its own cloakroom, and the ventilation and heating will be automatically controlled. The total number of classrooms will be 25.

In the basement the plans show a gymnasium, workshops for technical training, boys' recreation rooms, janitor's quarters, boiler room, and heating and ventilating equipment. The heating will be by direct radiation with hot water; ventilation is to be maintained by forced draught, the air entering the classrooms and circulating into the cool rooms, where it will be drawn out at the floor level into vents discharging through the roof. Mr. David H. MacFarlane, of Montreal, is the architect.

Disintegration of Concrete with Cinder Aggregate

THE following is an epitome of an investigation made at the University of Nebraska into the causes of disintegration as it occurs in concrete having a cinder aggregate. The experiments made suggested the probability that oxidation of iron and sulphur produced internal stress and consequent cracking, aided, no doubt, by the general weakening produced by the diffusion of the soluble sulphates. This view was confirmed by finding that the efflorescence, found on the surface of the disintegrating concrete, contained ferrous sulphate. These results were then attempted to be brought about by substituting, for cinders, artificial iron sulphide, prepared in several ways, but the mixtures did not behave similarly. On breaking open the blocks, the sulphide was found to be unchanged, surrounded by hard, compact cement. Soluble sulphates being absent in these trial mixtures, the blocks had, of course, greater initial strength than those containing cinders, and would have withstood considerable stress, had there been any applied. The lack of oxidation, in these tests, indicated that, in the case of the cinders, the necessary oxygen must have come from the cinders themselves, since they were equally placed in relation to atmospheric aerations.

This observation drew further attention to the composition of the cinders used when it was found that about one-third of it was a very porous coke. As is well known, coke, as other forms of carbon, will persistently seclude large amounts of oxygen gas.

According to the experiments of Messrs. Starr & Lewis, air-dried coke contains absorbed gases to the extent of 0.7 cubic centimetre per gramme of coke, 2 to 6 per cent. of the gases being oxygen.

The oxidation observed in the Nebraska tests was most pronounced where the coke was present in the concrete. Some pieces of coke picked from the stock of cinder, when analysed, showed about 1 per cent. of sulphur, in the form of sulphide; that is capable of undergoing oxidation.

In further experiments, some of the original stock of cinders was exposed for a period to air and moisture, until, on washing, it showed the presence of no soluble sulphate.

It was then made into a block of concrete similar to those prepared before, 1:1:1, when under parallel conditions no disturbance took place, the material remaining firm and compact.

From these tests the opinion is expressed that cinders with much sulphide and sulphate in them are likely to give unsatisfactory results, and especially so if there be much coke or porous air absorbent material present. Such material may be improved by methods that bring about the removal of the injurious components, and in this direction are to be mentioned weathering, with occasional washing until the ferrous compounds and sulphur have been oxidized to their full extent, and subsequently washed out.

Railway Records Looked For in 1913

THE present year will be a record-breaker in the way of railway construction, because, under present arrangements, the three railway companies, the Canadian Pacific, Canadian Northern and Grand Trunk Pacific, will altogether build 2,700 miles and additional trackage. This will mean an increase of 725 over last year's construction work, which totalled 1,975 miles and was built at a cost of nearly $30,000,000. In 1913 the three roads will spend approximately $41,000,000 on new construction work. Out of the 2,700 miles of new lines to be constructed throughout the Prairie Provinces and British Columbia, the Canadian Pacific Railway alone will build between 1,000 and 1,100 miles of additional trackage, and the balance will be the work of the Canadian Northern and Grand Trunk Pacific. One of the chief undertakings of the Canadian Pacific will be the double-tracking of the main line between Brandon and Calgary.

Grease recovery at the Washington sewage disposal plant of the city of Manchester, England, during the last fiscal year, amounted to 11.9 tons, upon which a sum of about $200 was realized.

The total mileage of improved roads in the United States in 1909 amounted to 190,476 miles, or 8.66 per cent. of the total, according to a recent report of the Secretary of Agriculture. During 1911 the expenditures on public roads amounted to about [illegible]

Cost of Concrete Walls

WITH the increasing popularity of concrete construction the question often comes up as to the cost of different forms of work of this nature. Not long since an interesting discussion developed concerning the economy of blocks as one kind of unit wall construction, and the Cement Age published the views thereon of two well-known experts in concrete construction. One of these, Alan P. Wilson, of Milwaukee, furnished the following:—

"In talking with a contractor who has been using metal forms for the past three seasons, I asked him for some inside information, not only as to the cost of handling metal forms, but of placing concrete in walls raised about 20 feet above grade. This contractor places his concrete exclusively with wheelbarrows, so that the figures he gave are doubly interesting.

"He said that after three years' experience with metal forms he can mix, form and place concrete in 12-inch walls at 4½ cents per square foot of wall, or $1.21½ per cubic yard.

"On basis of material prices, above, mentioned, 1:3:5 concrete containing

1 bbl. cement at $1.50	$1.50
[illegible] yd. sand at $1.50	.62
20-27 yd. stone at $1.50	1.10
1 lb. steel at $0.02	.02
[illegible]	$3.24

would make, allowing 1¼ yards of loose material for each yard of concrete, 28.2 cubic feet of concrete, at a cost, for materials, of 11.5 cents per cubic foot.

"This would make the cost per square foot of a monolithic wall, 12 inches thick, as follows:—

Material	11.5 cts.
Mixing and placing, including necessary staging	3.0 cts.
Forming with metal forms	1.5 cts.
Total cost of wall per sq. ft.	16 cts.

"Comparison between a 12-inch monolithic concrete wall and a cement block wall of the same thickness is manifestly absurd, as a monolithic wall only 6 inches thick would be very much stronger and more impervious to wind and water than a 12-inch block wall. The cost per square foot of 6-inch monolithic wall would be as follows:—

Material, ½ cu. ft. at 11.5 cts.	5.75 cts.
Mixing and placing	1.50 cts.
Metal forms	1.50 cts.
	8.75 cts.

"Some allowance must be made for added cost of staging, but this contractor's experience has been that one-fourth of one cent will amply cover the difference between 12-inch and 6-inch walls, so that 9 cents per square foot would amply cover the actual cost of a monolithic concrete wall, on basis of material prices as given.

"The figures above given are based on experience on a wide range of work covering a long period. They include every item of expense incidental to the construction of monolithic concrete walls, including mixing, wheeling and spading the concrete, cost of staging, setting up, removing and cleaning the metal forms, transporting the equipment from one job to another, and an allowance for interest upon and depreciation of the value of the equipment.

"If a finish coat is applied to the surface of the monolithic wall, it can be given a smooth and uniformly colored finish at a total cost for labor and material not exceeding 2½ cents per square foot of exposed concrete. The surface left by metal forms of proper design is so smooth, however, that on a wide range of work no surface treatment is required."

Cut Stone Men Convene at Toronto

THE tenth annual convention of the National Cut Stone Contractors' Association was held in Toronto, at the King Edward hotel, on January 14th-16th. A meeting of the Executive Committee was held on the opening day, while the convention proper was called to order on Wednesday, January 15th, by His Worship Mayor Hocken. Excellent reports on the year's business were submitted by the special committees and by the secretary and treasurer. The annual banquet, which was held on Thursday evening, was one of the most successful functions of the kind in the history of the association. The election of officers resulted as follows:—President, Charles G. Fenning, Chicago (re-elected); vice-president, Jas R. McLaren, Brooklyn, N.Y.; secretary, Henry Struble, Chicago. Executive Committee:—P. B. Parker, New York; G. C. Brown, Newark; A. E. Dickinson, Chicago; J. P. Falt, Springfield, Mass.; Geo. Oakley, jr., Toronto; C. W. Walters, Chicago; Wm. McMillan, Chicago; C. W. McCormick, Cleveland; James Hastings, Philadelphia.

The following papers were read:—"Law as Applied to Business," by J. T. Hettrick, of New York; "Business Associations Under the Sherman Anti-Trust Law," by L. E. Hart, of Chicago, and "Canada and Its Resources," by F. S. Spence.

The convention will be held in Philadelphia next year.

Deep reinforced concrete beams are a feature of a six-storey fireproof warehouse, recently built for the J. K. McIntire Company, of Dayton, Ohio. The need for these beams was occasioned by the omission of two columns on the first floor, which was decided upon after the building was started. This was done to provide room for turning motor trucks within the building area. To care for the increased bending movement caused by the greater span, a combination frame, with outside beams 16 in. wide and 42 in. deep and inside beams 30 in. wide and 90 in. deep, was built across the 38 ft. 6 in. span. Otherwise the building is of flat slab construction with 8-in. slabs and panels 19 ft. 2 in. by 15 ft. 9 in.

A plant for electrically sterilising water by means of electrically-produced ozone has been erected at a station of the Baltimore County Water and Electric Company in Maryland. It has been found, says Electrical Engineering, that the area required is only one-tenth that required for rapid sand filtration. The ozone generator is 33 inches high by 33 inches diameter. A large number of aluminium tubes are used for the production of the electric discharge. Each unit can deal with one million gallons per twenty-four hours, and requires five kilowatts, that is, about 18 watts per square foot of electrode surface.

Constructional Progress at the Capital

Exterior Work Completed on Many Large Structures—Proposed Federal District Scheme—Water Problem Still Unsolved

Correspondence of the Contract Record

Ottawa, January 18, 1913

THE past few weeks have been remarkable for Ottawa, owing to the fact that a number of large structures have had the main construction work completed. Among these may be mentioned the Jackson Booth building, Sparks street, eight storeys in height, cost $150,000; Masonic Temple, Metcalfe street, five storeys, cost $100,000; theatre on York street for Mr. Labelle, four storeys, cost $50,000; Blackburn Building, Sparks street, ten storeys (last stage being entered upon) cost $600,000; Campbell's factory, Eastern ave., steel work completed, concrete work commenced, cost $50,000; Chalmer's Church on O'Connor street, mason work nearing completion, cost $100,000.

Permits are still being issued in large numbers, mostly for dwellings and residences. The aggregate amount of permits issued during December was $199,800.

Blackburn Bros. Building

The photograph of the above building reproduced herewith, shows the commencement of the last part, directly above the Union Bank offices at the corner of Metcalfe and Sparks streets. It marks the last stage in the construction of a work which is costing $600,000. The Dominion Bridge Company are supplying and erecting the steel. Mr. Noffke, of Ottawa, is the architect.

Jackson Booth Building

The above building, of which we reproduce a photograph, is being erected on the north side of Sparks street, between O'Connor and Bank streets, at a cost of about $150,000. Mr. J. A. Ewart is the architect, and Mr. Alex. Garvock the builder. The building is constructed on the Kahn system of reinforced concrete and is eight storeys high—provision being made for carrying it to the maximum height of ten storeys if required. At present the main concrete work is completed. The interior and facing work will be carried out throughout the winter months.

Hopewell Smallpox Hospital

This structure, although completed externally, is far from being finished. The interior seems to be taking too long to complete—the delay being the want of material. As there are several cases of smallpox in the city at present, the Board of Control will probably place a penalty on the contractor, if the work is not completed by the end of this month.

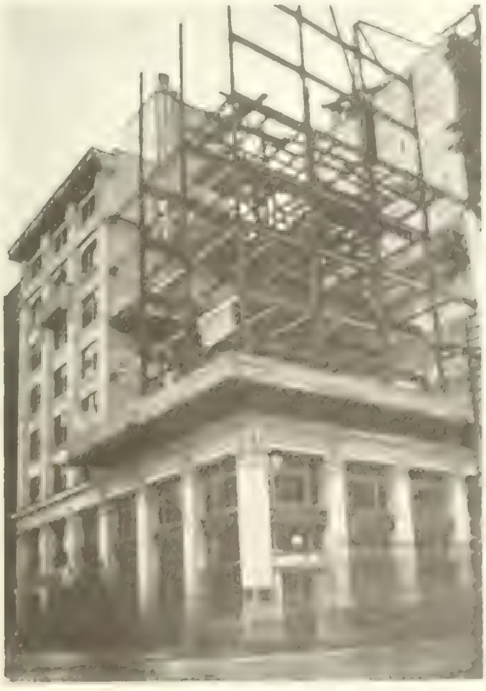
The Council are placing a high wall, about two hundred feet from the building, across the island upon which it is built. The portion of the island left will be taken over by the Ottawa Improvement Commission and turned into a park. The island was used formerly as a dump for the city's refuse.

Civic Abattoir

The abattoir committee has recommended that the city take immediate action to establish a civic abattoir at an estimated cost of $80,000. The building will be adequate to serve Ottawa for quite a number of years.

Eastview Annexation

The annexation committee of the city of Ottawa had several proposals of annexation before them at their recent meeting. Applications were received from Cysville, East-



Jackson-Booth Building, Sparks Street, Ottawa
Mr. J. A. Ewart, Architect

Blackburn Bros. Building, Sparks Street, Ottawa
Mr. W. E. Noffke, Architect

[illegible] Rockcliffe Company (Land north of Eastview) and Clarkstown Village, which is a part of Eastview. The committee [illegible] that Clarkstown and the Rockcliffe Company's Land should be annexed. Eastview proper wanted too [illegible] including [illegible] fixed assessment for a stipulated number of years. Cyrville's application was more favorably received, [illegible] the committee was of opinion that the time was not ripe for its annexation. Cyrville lies about four miles from the City Hall in a southerly direction.

That part of Eastview, or Clarkstown, annexed, will add approximately one hundred and twenty acres to the city, and a population of about two thousand. Immediate local improvements will cost $46,000. Of this amount $40,000 is for sewers and the balance for concrete sidewalks.

The annexation will also allow of the extension of the Ottawa Electric Railway to Beechwood Cemetery, and the much required improvement of Beechwood avenue road.

The Federal District

Mr. N. Cauchon, of Ottawa, has been commissioned by the government to prepare a plan of the proposed area to be taken in if Ottawa and suburbs are turned into a Federal District. The plan will show all the registered estates, at present sub-divided, also contemplated sub-divisions. Hull will also be on the plan, as it is proposed to take in that city, so that the waterfront may be improved on both sides of the Ottawa River. The map will be stretched out westerly as far as Britannia, and its easterly boundary will be the Ottawa River at the rifle ranges. Southerly the map will contain the village of Cyrville. Hull will be the boundary on the north.

There is a hopeful feeling that this scheme will pass through the government, and it is anticipated that two years from now Ottawa will be a Federal District, run by a Commission.

Mechanical Filtration By-law

The by-law for the above plant on Lemieux Island, involving an expenditure of a million and a quarter dollars, was rejected, the vote being—for the plant, 1,462; against, 4,836. Mr. Hazen, of New York, who has been working on the plans for the last two months, will have to be paid something like $25,000 for his work.

Mayor Ellis intends bringing a British engineer of high standing to report upon the best source of water supply for Ottawa. What he says will carry, for the people will not be allowed to vote upon the question again, as they have already turned down the McGregor Lake scheme, and now the mechanical filtration scheme.

Other By-laws

The Ottawa Electric Railway by-law, to permit the company to extend its lines in Ottawa South, was carried by a huge majority. About three miles of track will be constructed.

The Ottawa and Morrisburg Electric Railway by-law to permit the company to enter the city, was carried by a large majority. The company will commence construction work in the spring, and will spend about a million dollars on track, sheds and equipment.

Waterworks Control Under Commission

A plebiscite was taken as to whether the control of the waterworks should be given to the Board of Control or to a paid commission. By a majority of 1,892 the control was transferred to a paid commission, which will be done at the very earliest time after the special legislation is secured from the Provincial authorities. The commission will be paid at the same rate as the Board of Control, namely, $1,000 a year.

There is a proposal on foot to equip the Police Department with a special alarm system at an estimated cost of $30,000. The system is to have sentry boxes in different parts of the city with a telephone outfit in each. It is considered that seventy-five of these patrol boxes would do for Ottawa.

The civic teamsters, numbering fifty-five, who work on snow-cleaning during the winter, have had their pay increased from $4.90 to $5.30 a day. This was upon the recommendation of City Engineer Ker.

Presentation to City Engineer Ker

Before leaving for the West, Mr. Newton J. Ker was presented with a handsome piece of silver plate, and also an illuminated address, by the members of his staff. Mr. Ker was in the employ of the city of Ottawa for fifteen years.

Mr. Frank C. Askwith, of the City Engineer's Department, is Acting City Engineer until another appointment is made.

Canadian Consulting Engineers

Mr. C. E. Cartwright, Vancouver

Mr. C. E. Cartwright whose photograph is reproduced here is senior member of the firm of Messrs. Cartwright & Company, consulting engineers, Vancouver, B.C. He is a native of Toronto and has made Vancouver his home since he first came here in 1899. Mr. Cartwright is chairman of the Vancouver Branch of the Canadian Society of Civil Engineers. He holds a membership in the American Railway, and Maintenance of Way Association, is a licensed B. C. land surveyor, and for five years before entering private practice was divisional engineer for the Canadian Pacific Railway in B. C. He was one of the organizing members of the local branch of the Canadian Society of Civil Engineers.

Mr. C. E. Cartwright, Vancouver

The Western Ontario Clay Workers' Association will hold their Annual Convention at Windsor, Ont., February 12th and 13th. A number of good practical papers are scheduled for presentation and a record meeting is hoped for. The Secretary is Mr. Alfred Whalen, of Cairo, Ont.

Vancouver Promises An Excellent Start

Facts and Figures of 1912 and Their Relation to 1913 —A Season of Record Activity Confidently Awaited

Vancouver, January 8th, 1913.

THE building permits of the city of Greater Vancouver for the year 1912 furnished remarkable evidence of the unprecedented growth which has taken place throughout the district during that period. The outlying sections of Vancouver, in which are included South Vancouver, North Vancouver and Point Grey, taken together with Vancouver proper, have a total amount of building authorized, amounting to $26,232,968, this total being made up as follows: Vancouver proper, $19,408,422; South Vancouver, $2,824,546; North Vancouver Municipality and district, $1,000,000; Point Grey, $3,000,000.

The permits issued in Vancouver proper during the past year show an increase of $1,748,962 over the previous year's figures, the amount for 1911 being estimated at $17,659,460.

The heaviest month for the year 1912 was October, when $3,597,795 was the value of permits issued within the city boundaries, this amount placing Vancouver as the fourth city on the continent in point of building construction. The year may rightly be considered as a historic one in the building-up of the city by reason of the fine type of office buildings which have been erected. Such buildings as the Burns Block on Granville street, the Rogers Block on the same street, and the Dominion Trust Building on Pender street are excellent examples of this type. A notable feature in the past year's operations has been the value of permits issued for the construction of office buildings and stores, and for apartment and rooming house buildings. The amount expended in offices and stores totalled $7,299,704, and 293 permits were taken out.

The building of apartments and stores involved the sum of $6,235,805, the number of permits being 218. More than one-third of the total amount expended in building during the year has been for residences, the amount for this class of construction in Greater Vancouver being placed at $10,770,514. In this connection, the greatest activity was witnessed in North Vancouver, South Vancouver and Point Grey, which are purely residential districts as yet. The erection of factories and warehouses within the city boundaries represented a total expenditure of $1,748,582, which is a comparatively small amount. It is to be hoped that the year 1913 will witness greater activity in building construction of the latter type.

New Fifteen Storey Office Building

Tenders were being received at Vancouver until noon on January 20th for the erection of the fifteen-storey Weart Building on the corner of Hastings and Richards streets. According to present arrangements, work is to commence on April 1st. The building will be of steel construction, faced with pressed brick, and terra cotta, and will be used as an office block. Messrs. Russell, Babcock & Rice, Vancouver, are the architects.

Early in January the Vancouver Breweries, Limited, were calling for tenders for a new addition to their present buildings on Seventh avenue, Vancouver. The building will measure 75 x 120 feet, and will be of reinforced steel and concrete construction. The estimated cost is $175,000.

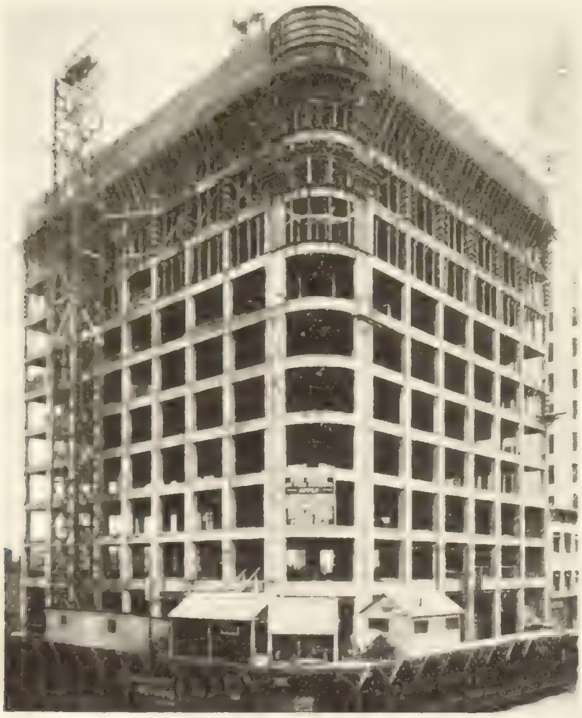
New Apartment Buildings to be Erected

Plans of a new apartment house which is to be erected at the corner of Hastings street east and Jackson avenue, Vancouver, have recently been completed by Messrs. Braunton & Leibert. The building may be styled an apartment hotel. It will be six storeys in height and will contain 75 suites, comprising one room, kitchenette and bath. The

New St. Paul's Hospital under construction on Burrard street, Vancouver. Architect Mr. R. F. Tegen. Contractors, Norton Griffiths Company.

building will be of reinforced concrete, steel and mill construction, faced with pressed brick. Fir is to be employed as inside finish. The main entrance will be panelled in fir, and the corridors will be wainscotted with the same material to a height of 30 inches. The main lobby, situated on the ground floor, will have tiled floors with a marble base. Five stores will occupy most of the ground floor space. All suites will be furnished with disappearing beds, and the floors and walls of the bathrooms will be finished in black and white tile. The building will be equipped with two elevators. Steam heat is to be used. It is announced that construction work will commence at an early date. The total cost of the structure is placed at $155,000.

Mr. E. J. Ryan was recently awarded the contract for the erection of a store and apartment building on the corner of Howe and Dunsmuir streets, Vancouver, at a cost of $145,000. The owners of the proposed building are Messrs. W. J. Bowser and G. J. Wilson. The structure will measure 85 x 120 feet, and will be of mill construction, faced with pressed brick, with stone trimmings. It will be four storeys in height. The main entrance will be elaborately decorated in marble and tile. The corridor halls will be finished in ornamental plaster with oak veneer panelling. Fir is to be used as interior finish. The ground floor will be occupied by seven stores, and the three upper storeys will contain 118 rooms. The floors of the bathrooms are to be tiled, and the walls will be ceramic tile. An oil-burning plant will be installed to generate steam heat. The architects for this building are Messrs. Parr & McKenzie & Day. Work is to begin immediately.



Birks Building, Granville and Georgia streets, Vancouver. Contractors, Norton Griffiths Company

Tenders are now being called for the erection of a six-storey brick and mill construction building at the corner of Burrard and Robson streets, Vancouver, for Mr. C. N. Davidson, at an approximate cost of $132,000. The building will occupy a lot 85 x 120 feet, and will be faced with pressed brick, trimmed with stone. There will be four stores located on the ground floor, and 195 rooms on the floors above. Each room will have hot and cold water. Hot water will be used for heating. Messrs. Braunton & Leibert are the architects.

Plans are being prepared for a six-storey mill construction building to be erected on Georgia street, between Jervis and Broughton streets, Vancouver. The building will be 66 x 132 feet, and will be faced with pressed brick, trimmed with terra cotta. The main entrance will be finished in marble and tile. The building will contain fifty-six apartments of two and three rooms each. These will be panelled in B. C. fir, and will be fitted up in a very complete manner. Hot water will be used to heat the structure. Construction is expected to commence early in February. The cost of this building is estimated at approximately $125,000. Mr. Emil Guenther prepared the plans.

The first building permit issued for 1913 at Vancouver, was for a hotel building, costing approximately $150,000, to be erected beside the Pantages Theatre on Hastings street east. The building will have a frontage of 50 feet, and a depth of 120 feet. It will be eight storeys in height, and is to be of steel and concrete construction, with pressed brick exterior. Mr. Emil Guenther is the architect, and the contract has been awarded to Mr. E. J. Ryan.

Messrs. Braunton & Leibert, architects, are preparing plans of a four-storey, reinforced concrete office building for the Standard Trust & Industrial Company, Vancouver. The exact location of the proposed building has not been decided upon. This structure will measure 25 x 120 feet, and will be faced with stone and terra cotta. Provision is being made in the design for the addition of two extra storeys, when required. The main offices of the company will be located on the ground floor. These will be finished in marble, with tile floors, and all woodwork will be mahogany. There will be no central base supports on the ground floor, the building being entirely supported by the side walls. The basement will contain safety deposit boxes, a large office finished in marble, with tile floors, and steam heating apparatus. The upper floors will be occupied by 39 offices, which are to be finished in oak. In all corridors above the ground floor, marble is to be used for panelling. Work on this building will probably commence about February 1st. The cost is placed at approximately $45,000.

New Hotel Nearing Completion

Work is advancing rapidly on the new hotel which is being erected for Dr. Wilson at the corner of Hastings street east and Dunlevy avenue, Vancouver. The building occupies a ground floor space measuring 75 x 120 feet, and is six storeys in height, with headroom of 10 feet 6 inches in the basement. The structure is of concrete, pressed brick and mill construction, with galvanized iron cornice. The main entrance is to be finished in marble and tile, and an iron canopy will be erected in front. The stairs leading from the entrance up to the first floor are marble. The ground floor of the Hastings street frontage is occupied by five stores. The store fronts will be finished in copper; plate glass will be used for the windows. The building contains 190 large rooms. These are fitted with all the latest improvements, B. C. fir is used as inside finish throughout. All toilets and bathrooms are finished in marble and tile. The construction of this building has been extremely rapid; after leaving the concrete foundation only thirty working days were spent in the construction of the walls and roof. It is expected that work will be completed by the end of February. Mr. J. Y. McCarter, North West Trust Building, Vancouver, was the architect, and the Dominion Construction Supply Company, Limited, of the same address, had charge of the contract.

Extensive Harbor Developments

The announcement that the Dominion Government is taking steps to provide Vancouver with a public wharf at which all ships and all transportation companies will have equal rights, was received in this city with much satisfaction. According to Mr. H. H. Stevens, M.P. for Vancouver, the contract for the construction of the wharf on the Vancouver side of Burrard Inlet will be let before the end of February. The site selected is the property bounded by Park and Salisbury Drives, the C. P. R. tracks and Burrard Inlet. A frontage of about 632 feet will be provided in this site, which is valued at approximately $750,000. The city will probably agree to give the government control of the street ends, so that the whole property can be utilized for public docking facilities. The most reliable methods will be employed in the construction of this dock. The piers and foundations will be of reinforced concrete construction, and the superstructure will also be of substantial material.

The dock will be between 850 feet and 1,000 feet in length, and will be 250 feet in width. There will be provision for two slips, one at each side, each eighty feet wide. This will give the city ample space for whatever floats it wishes to construct, as the whole of the government docking will require but 410 feet. On this dock will be built three sheds, one at each side and one at the front end. Three railway tracks running the full length of the dock, and connected with the C. P. R. lines will be constructed so that the largest of ocean-going ships and steamers may be loaded directly from the cars. There will be roadway sufficient to permit of the operation of large motor trucks and teams. These will be built outside of the sheds.

Office Building, Pender Street, Vancouver, First completed for the B. C. Securities Company and the Dominion Trust Company. Architect, Mr. H. S. Griffiths. Contractors, Norton Griffiths Company

The machinery to be installed at the dock for the handling of cargoes will be of the latest design. The government is contemplating the expenditure of about $1,250,000 for this project. This includes the price of the property, the construction of the dock, and installation of the equipment. Plans are in course of preparation for a new emigration shed, which will probably be placed to the east of the shore end of the dock. It is understood that the construction of the shed is not included in the appropriation for the dock. The shed will be four storeys in height, and is to be of stone or brick, and reinforced concrete construction, and will cost in the neighborhood of [illegible]

Prices of Building Materials at Vancouver

(Delivered on Job)

Building paper, No. 1 tarred, per roll	$ .90
Building paper, plain, per roll	.70
Bricks, common, per thousand	13.00
Bricks, pressed, per thousand	45.00
Cement, Portland, per bbl.	3.00
Fire brick, per thousand	45.00
Lime, per bbl.	1.25
Sewer pipe, per ft., 4-in.	.14
Plaster of Paris, per bbl.	4.50
Putty, per pound, bladders, in 100 lb. cases	3.50
Hard wall plaster, per ton	14.50
Nails, wire, per keg	3.25
Nails, cut, per keg	4.25
Mixed paint, per gallon	$1.25 to $2.75
Boiled linseed oil, gallon in bbls. of 8 gallons each	1.05
Boiled linseed oil, per gallon	1.25
Hair fibre, per ton	14.50
Fire clay, per ton	20.00
Lath, No. 1 pine	2.25
B. C. cedar shingles, No. 1	2.20
B. C. cedar shingles, No. 2	2.10
Lead pipe, per lb.	.07
Dry colors:—	
White lead, per lb.	.15
Red lead, per lb. kegs	.08
White lead, per 100 lbs. in oil	10.00
Gasoline, in barrels, per gallon	.30

Accommodation for emigrants of all nationalities, and space for the offices of the American and Canadian immigration authorities will be provided.

Other improvements for Vancouver harbor are under consideration at Ottawa, and further announcements are expected shortly. The harbor, and government owned dock, as well as other habor facilities, come under the direction of the harbor commission, which it is proposed to establish for Vancouver and North Vancouver. The bill to provide a harbor commission for both cities will be introduced shortly in the Dominion Parliament, the bill to be modelled on the same lines as the Montreal harbor bill. North Vancouver is to be provided with a dock of about the same capacity, and at approximately the same cost as that which is to be built in Vancouver. The site has already been selected and plans are being prepared. It is proposed that a sum of $5,000,000 be set aside for present requirements at both ports. It is also announced that False Creek will be dredged from Main street to the mouth. A channel 300 feet wide, and 20 feet deep at low water is proposed.

The government has also under consideration the construction of a large grain elevator at Vancouver, and it is understood that the grain commissioners will visit the city shortly for the purpose of making a report on the matter.

Mr. H. M. Davy, of Ottawa, government engineer in charge of test borings in Burrard Inlet, has completed his report on the local harbor and all the necessary data in connection with this work has been forwarded to the Public Works Department at Ottawa. The work done by Messrs. Davy and Lafleur on the harbor during last summer and fall was the precursor of the Dominion Government's plan in regard to the development of harbor facilities in Vancouver. It is understood that Mr. Davy will perform similar work in respect to the projected government wharf between Park and Salibury Drives, in the East end.

The estimates of school expenditure [illegible] for the year [illegible] comprise the sum of [illegible] and [illegible]

[illegible] to the ratepayers for this amount, in January. Two by-laws will be submitted. Under the first, a sum of $40,000 is asked for, to provide a new eight-room school house on Vancouver Heights, while the sum of $29,400 is placed on the estimate for new buildings and additions to existing buildings, as well as $6,450 for improving school [illegible]

The second by-law provides for the purchase of two [illegible] sites and for clearing sites, the amount [illegible] for these purposes being $25,000

For the construction of new roads and for waterworks extensions throughout the municipality, the electorate will be asked to endorse a by-law amounting to $400,000.

North Vancouver ratepayers recently passed two money by-laws aggregating $100,000 for school and waterworks purposes. A sum of $62,000 will be raised to establish a system for supplying water to the higher level of Lynn Valley, and the school by-law for $40,000 will be expended in the purchase of additional school sites.

By-laws aggregating over $1,000,000 will be submitted to the Point Grey ratepayers early in January. Of this amount $740,706 is for the extension of the sewerage system, chiefly in West Point Grey, $100,253 for extensions to the waterworks system, $250,146 for opening, improving and extending roads, and $100,253 for the purchase, extension and improvement of park sites.

Personal Mention

Mr. Joseph D. Evans has resigned as Chief Engineer of the Montreal Tramways Company to become Construction Manager of the Electric Bond & Share Company, New York City.

Mr. H. J. Fuller, president of the Canadian Fairbanks-Morse Company, and Mr. F. P. Jones, general manager of the Canada Cement Company, have been elected directors of the Canadian Bank of Commerce.

Mr. Harry S. Van Scoyoc, Montreal, road engineer, Canada Cement Company, Limited, was among the candidates admitted to membership in the American Society of Civil Engineers at a meeting of the Board of Direction on Jan. 7.

Messrs. W. G. Ross, Farquhar Robertson and Lieut.-Col. E. A. Labelle have been appointed members of the Montreal Harbor Commission. Mr. Ross is managaing director of the Montreal Street Railway, Mr. Robertson is head of the firm of Farquhar Robertson, Limited, coal merchants; and Lieut.-Col. Labelle is general manager of the St. Lawrence Flour Mills, Limited.

The Universal Crusher Company of Cedar Rapids, Iowa, manufacturers and patentees of the original Velten Universal Crusher, have taken over the entire sale and control of the line of crushers heretofore manufactured and sold by the Eureka Stone & Ore Crusher Company, of Cedar Rapids, Iowa. The Universal Company will continue manufacturing both lines at the Eureka plant.

Publications Received

Joslin's Handy Estimate Blank, David Williams Company, New York, price 25 cents each. These blanks should be found very useful to the estimator and contractor. Provision is made for everything required in modern building, contracting, ranging from the cottage to the small-sized apartment house. Spaces have been left for figuring the labor on each item or section of work, and for adding any extras. There are special pages for listing sub-contracts, and the profit on the job is put in its proper place at the end of the estimate.

The New Building Estimator (11th edition, revised and enlarged) by William Arthur; published by David Williams Company, New York. This work is one of the most popular for calculating the cost of building construction. It treats the subject thoroughly, both in detail and approximately—a double arrangement which is of great value to the estimator. The book aims to be "a practical guide to estimating the cost of labor and material in building construction, from excavation to finish." In revising the present work, Mr. Arthur has added about 250 pages of up-to-date practical matter covering reinforced concrete and a variety of other subjects. The book is well illustrated, well bound, and gilt-edged, and consists of 744 pages. The price is $3.

News and Notes

The Canadian Stewart Company have been awarded the contract for the construction of the new grain elevator to be erected at Quebec. It will be of one million bushels capacity, but can be extended to contain 2,750,000 bushels.

On January 10th Mr. Harold Parker, M.Am.Soc.C.E., First Vice-President, Hassam Paving Company, Worcester, Mass., delivered an illustrated lecture on "Specifications Covering Patented Pavements," before the Graduate Students in Highway Engineering at Columbia University.

The Canadian Supply Company have recently secured a number of noteworthy roofing contracts, these including the new plant of the St. Lawrence Starch Company, at Port Credit, Ont., the C.P.R. freight terminals at Toronto, the Empire Cotton Company's plant at Welland, and the extensive works of the Ontario National Brick Company at Cooksville. In all, the contracts comprise about half a million square feet of surface.

Mr. Frank B. Goodman, 270 Yonge street, Toronto, has secured the Ontario agency for Carbo-Via pavement, patented in Canada and manufactured by the Continental Bitumen Company, of Toledo, Ohio. The patentee is Mr. H. G. Jennison, of Toledo, the pioneer of the United States creosoting industry and president of Jennison & Wright Creosoters, Toledo, Ohio. It is stated that one hundred miles of Carbo-Via has been laid on the highways around Toledo with the most satisfactory results.

Mr. W. Furniss Clarke, manager and director of Geo. Anderson & Company of Canada, Limited, Montreal, manufacturers stone machinery, has just returned from an extensive visit to the West, where he has appointed several agents. He reports business to be excellent. Mr. Clarke has just left for Carnoustie, Scotland, to see his principals, with the object of arranging, if possible, for the establishment of works in Canada. The company's specialities include circular diamond saws and quarry machinery.

F. Reddaway & Company, manufacturers of the well-known "Camel" and "Camel Hair" brands of belting and linen fire hose, stitched cotton belting, etc., 595 St. Paul street, Montreal, Que., have sent out to their friends a useful little pocket diary neatly bound in red leather. The diary contains pages for memoranda of various kinds, as well as a useful assortment of general information upon subjects which everyone wishes to have at his finger ends. The company advise us that although the supply is limited they will reserve a few copies of this useful little pocket book for readers of the Contract Record who may inquire for it.

With a view to meeting the increasing demands for their products, the directors of the Dominion Marble Company of Turcot, P.Q., have decided to increase the quarry equipment and also the capacity of the finishing plant in Montreal to nearly double the present size. The company are issuing $150,000 six per cent. 15 year bonds in order to obtain the additional capital required. The contracts now being filled represent about $200,000. The company furnished all the marble used in the new C. P. R. office building in Toronto, and for the Federation Life Building, Winnipeg; while they will also supply the marble required for the addition to the Montreal City Hall.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Edmonton, Alta.
Street and sewer work, cost $452,164, contemplated. Clerk, F. M. C. Crosskill. Engineer, A. J. Latornell. By-law has been passed by council.

Leamington, Ont.
Sewerage system, cost $15,000, contemplated. Mayor, W. E. Snider. Plans and estimates to be prepared shortly.

Listowel, Ont.
Paving is completed and matter will be decided on shortly by Council. Mayor, Wm. Climie.

London, Ont.
Watermains, etc., planned by City Council, to be installed in Pottersburg Ealing. Mayor, C. M. R. Graham. Engineer, H. J. Glaubitz.

Purchase of paving plant is contemplated by City Council. Mayor, C. M. R. Graham. Concrete mixers and general road making equipment required.

Moose Jaw, Sask.
Sidewalks, cost $150,000, under contemplation of the City Council. Clerk, W. F. Heal. 53,316 feet, including crossings, are included in the estimate for 1913.

25,940 feet of sewers and watermains, cost $173,000, are contemplated for 1913. Clerk, W. F. Heal.

Paving, cost $46,000. 9,984 sq. yds. is contemplated during 1913. Clerk, W. F. Heal.

Point Grey, B.C.
The West Point Grey Improvement Association will ask Dominion Government for an appropriation for the construction of a large breakwater across the Spanish Banks. Plans prepared by Captain Cochran. Secretary, R. C. Desrochers, Ottawa.

Port Stanley, Ont.
Roadway and bridge planned by Town Council. Reeve, H. Taylor. Plans and specifications at office of engineer in charge, J. A. Bell & Son, Court House, St. Thomas.

Stamford Twp., Ont.
Waterworks contemplated by Township Council. Clerk, C. F. Munroe, Southend, Ont. Council to consider matter shortly.

Victoria, B.C.
Steel pipe, 10,000 ft. of 6-in. steel pipe and 3,000 ft. of 8-in. steel pipe for waterworks purposes. Tenderers are invited to submit their own specifications and to also submit a price for 4-in. steel pipe. Tenders received by Purchasing Agent until 4 p.m., Feb. 10, 1913.

Wallaceburg, Ont.
Waterworks. Council contemplate installing waterworks pumping plant on Snye River and building four miles of mains into town. Mayor, T. B. Dundas.

Winnipeg, Man.
Sewers for Rural Municipality of St. Vital. Reeve, R. Wilson, Grandvital P. O., Man. Engineer, L. G. Mullen, 372 St. Jean Baptiste street, St. Boniface, Man. Sewers in St. Marys road, St. Vital Road, Magee Drive and from St. Marys Road to River. Plans, specifications, etc., at office of engineer. Tenders received by Reeve until Jan. 24.

Woodbridge, Ont.
Railroad Construction for the new Canadian Northern Electric Line, construction work on same to start early in spring. Right of way has been secured to within 3 miles of Guelph.

Railroads, Bridges and Wharves

Beachburg, Ont.
C. N. O. Ry. Company's location of station on Lot 8 east of Little street at Beachburg, Ont., has been approved.

Brandon, Man.
Radial railways. Manitoba Government will be petitioned by the city for charter to build and operate a number of electric railways radiating from Brandon. Clerk, H. W. Brown.

Calgary, Alta.
Canadian Pacific Railway Company have been directed to construct siding for the Northern Electric & Manufacturing Company, Limited.

Cap de la Madeleine, Que.
Wharf extension, Dominion Government, Dept. of Public Works; Secretary, R. C. Desrochers, Ottawa. Tenders received by secretary until January 27th. Specifications, etc., at offices of J. L. Michaud, Dist. Engineer, Merchants Bank Bldg., St. James street, Montreal; A. R. Decary, District Engineer, Post Office Bldg., Quebec; Postmaster, Cap de la Madeleine, Dept., Ottawa, and MacLean Daily Reports, Limited, Toronto and Montreal.

Chatham, Ont.
Three bridges planned by City Council. Clerk, W. G. Merritt. By-law carried by ratepayers January 6th. Iron construction.

Eardley, Que.
Canadian Pacific Railway Company's proposed change in location of station at Eardley from Lot [illegible] Con. 9, Twp. Eardley, Co. Wright, Que., has been approved.

Feltzen South, N.S.
Breakwater, Dom. Government, Dept. of Public Works; Secretary, R. C. Desrochers, Ottawa. Tenders received by secretary until January 22, 1913. Specifications, etc., at office of C. E. W. Dodwell, Dist. Engineer, Halifax, N.S.; E. G. Millidge, Dist. Engineer, Antigonish, N.S.; Postmaster, Feltzen South; Dept., Ottawa, and MacLean Daily Reports, Toronto and Montreal.

Hudson, Que.
Canadian Pacific Railway Company have been authorized to construct, maintain and operate three spurs into the premises of the Montreal Ice Company.

Lennoxville, Que.
Canadian Pacific Railway Company have been authorized to construct branch line for the Eastern Townships Brick Mfg. Co., Twp. Ascot, Co. Sherbrooke, mileage 63.75 on Megantic subdivision near Lennoxville, Que.

Moose Jaw, Sask.
Canadian Pacific Railway Company have been authorized to construct spur for the Saskatchewan Bridge & Iron Works, Moose Jaw, Sask.

District of Nipissing, Ont.
Canadian Northern Railway Company have been authorized to construct bridge over Temagami River, Twp. Crerar, District Nipissing, Ont., mileage 270.9 west of Ottawa.

Ottawa, Ont.
Halifax Lightship, Dominion Government, Dept. of Marine and Fisheries; Deputy Minister, Alex. Johnston. Tenders received by Deputy Minister until January 31st. 114 ft. long, 29 ft. wide, first-class, single screw, steel, steam. To be delivered at Agency of Dept. of Marine and Fisheries, Halifay, N.S. Plans, etc., at office of Purchasing Agent of Dept., Ottawa; Collectors of Customs, Toronto, Collingwood and Port Arthur, Ont.; Agencies of Dept. at Montreal, Quebec, St. John, N.B., and Halifax, N.S.

Co. of Peel, Ont.
Canadian Northern Ontario Railway Company have been authorized to construct bridge across Cooksville Creek at mileage 13.84 from Toronto.

Twp. of Sandwich East, Ont.
Grand Trunk Railway Company have been authorized to construct siding into the premises of the Ford Motor Company of Canada, Limited, commencing at a point on its branch line of railway on Maisonville Avenue.

Stoney Point, Ont.
Grand Trunk Railway Company's layout of tracks and station at Stoney Point, Twp. Tilbury North, has been authorized and approved.

Toronto, Ont.
Canadian [illegible] Railway Company

have been authorized to construct spur on the property of Gunns Packing Company, situated north of St. Clair avenue and west of Gunns road, Toronto.

Vancouver, B.C.
Breakwater, False Creek. Dominion Government, Dept. of Public Works; Secretary, R. C. Desrochers, Ottawa. Specifications, etc., at office of C. C. Worsfold, Dist. Engineer, New Westminster, and Dept. Ottawa. Tenders received by secretary until February 17, 1913. Extended time.

CONTRACTS AWARDED.

Hamilton, Ont.
Piling, first $4,000 east end inlet. Mayor, John Allan. General contractors, Wise & Gray, York street.

Port Alberni, B.C.
Wharf for the Canadian Pacific Lumber Co., 400 ft. long by 200 ft. wide, 1,000 piles and 433,000 ft. of lumber will be used. Engineers, Hayne & Wilkinson. General contractors, R. H. Wood.

Prince Rupert, B.C.
Dry dock buildings for the G.T.R. General contractors, The J. F. Wineland Building and Construction Company, 402 Abbott street, Vancouver. For power house, machine shops and other buildings to be constructed in connection with the proposed drydock. The contract for the drydock proper has not been let yet.

Public Building, Churches, Schools, etc.

Brandon, Man.
Library. Clerk, H. W. Brown. Site has been purchased and plans will be prepared.

Byron, Ont.
Preventorium, cost $15,000, for London Health Association (Mrs. Adam Beck, Hedley, London). One storey, frame. Plans will be prepared.

Cardston, Alta.
Temple planned for Church of the Latter Day Saints. President, Joseph F. Smith, Salt Lake City, Utah, U.S.A. Architects, Pope & Burton, Salt Lake City, Utah, U.S.A. Work will be started in spring.

Edmonton, Alta.
Police buildings and equipment planned by City Council. Clerk, J. M. Miller. Estimates for 1913 include $47,843 for the work.

Edmonton, Alta.
Fire stations and equipment planned by the City Council. Clerk, F. M. C. Crosskill. Engineer, A. J. Latornell. Estimates for 1913 include $61,150 for fire stations and $83,064 for equipment.

Fort William, Ont.
Grain Exchange, cost $500,000, for the Fort William Commercial Chambers, Limited. Architects, Carl Wirth, Carson & Smithley, Murray Block. Tenders received by owners until January 30th. Plans and specifications at office of architects. 5½ storeys, 100 x 100, cement and piles, stone, reinforced concrete, terra cotta, tile and brick construction.

Frelighsburg, Que.
Town Hall planned by Municipal Council. Information from J. H. Baker, Frelighsburg ave.

Ingersoll, Ont.
Alterations to post office, Dominion Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Plans prepared.

London, Ont.
Vaudeville theatre planned, Dundas street, for Wm. Berrard, Dundas and Wellington streets, who is receiving estimates on theatre to accommodate about 2,500 people.

London, Ont.
Extensions for Western University. Site has been selected in Sunshine Park and plans will be prepared. Chancellor, Hon. R. M. Meredith.

Fire Hall contemplated by City Council. Mayor, Mr. Graham. Equipment required for fire alarm system to be installed later. Two storeys, white brick, stone foundation, shingle, felt and gravel roofinfig. Plans will be prepared.

Melville, Sask.
Church, cost $6,000, planned for German Evangelical Association (Rev. K. Gretzenger). Work will be started in spring as soon as the necessary funds are subscribed.

Montcalm, Que.
Church planned for St. Patrick's Congregation, Quebec. Further particulars from owners.

Montreal, Que.
Postal Station "H." Dominion Government, Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Tenders received by secretary until February 10. Plans, specifications, etc., at office of Cox & Amos, architects, 78 Crescent street, and at Department, Ottawa.

Moose Jaw, Sask.
Boat house planned by a Syndicate. Interested, Mr. Lewis Rice. The plans are to be submitted to the City Council for approval.

Prince Albert, Sask.
School, cost $20,000, addition, 20th St. planned for the Directorate of the St. Alban's Ladies College. It was decided at a meeting of the Directorate that a new wing, containing classrooms and dormitories should be added to the present building next spring.

St. Williams, Ont.
Opera house for J. F. Brock. Plans to be prepared shortly. Two storeys, brick construction.

Steveston, B.C.
Municipal building planned for The Municipality of Richmond. Architect, A. Campbell Hope, 603 Hastings street West, Vancouver, 52 x 60, reinforced concrete and brick construction, asbestos roofing, vaults. Building to combine municipal hall, court house and jail.

Vancouver, B.C.
Stadium, cost $300,000, Stanley Park, Board of Park Commissioners. Clerk, Wm. McQueen. Architects, Heath & Cove, Tacoma, Wash. Engineers, Ormond & Godfrey, 640 Hastings street W. To be built on the same style as the old Coliseum at Rome. Tenders will be called about February 15, 1913.

Victoria, B.C.
Meeting house, Fern street, contemplated for the Society of Friends, Courtney street. Site 76 x 240 has been purchased and plans will be prepared.

Winchester, Ont.
School, cost $9,000, under contemplation of the School Board. Two storeys, Plans will be prepared.

CONTRACTS AWARDED

Cowichan, B.C.
School. Dominion Government, Department of Public Works. Engineer, J. E. Griffith, Victoria. Minister, Hon. Thos, Taylor, Victoria. General contractors, Killen & Stedham, Victoria, B.C. Two rooms, concrete foundation, frame construction.

Hamilton, Ont.
Fire station, cost $25,000, Sanford ave. Mayor, Jno. Allan. Architect, W. A. Edwards, 2 Hughson street. Carpentry, Halliday Bros., 290 Cumberland avenue. Painting, Dickson & Allan, Emerald and Barton streets. Electrical work, E. A. Wark, 131 Stinson. Plastering, Hannaford Bros., Main street.

Hospital, cost $25,000, Euclid avenue. Mayor, John Allan. Architect, H. H. New, Spectator Bldg. Mason, Geo. F. Webb, Wentworth street south. Carpentry, T. D. J. Drake, 47 Earl street. Roofing, J. E. Riddell, King street east. Excavating started.

Theatre, cost $50,000, Mary street, for Dominion Theatres, Ltd., Mary street. Manager, E. R. Marshall. General contractor, A. Bresset, 216 Park St. N. Foundations in.

Montreal, Que.
Church, cost $62,000, Hogan, for Fabrique & St. Anseline, 350 Forsyth street. Architects, Viau & Venne, 76 Gabriel street. General contractor, E. N. Boileau, 474 Gilford. Only basement being built at present time. One storey, 133 x 160, brick construction, cement fndn.

North Saanich, B.C.
School. Provincial Government, Department of Public Works. Engineer, J. E. Griffith, Victoria. Minister, Hon. Thos. Taylor, Victoria. General contractors, Killen & Stedham, Victoria, B.C. Large one-room school, concrete foundation, frame construction.

Ottawa, Ont.
Booster plant house, cost $11,975, Slater street. Architect, F. C. Sullivan, Castle Bldg. Engineer, N. J. Ker. General contractors, Alexander & Campbell, Machinery Hall, Exhibition Bldg. Three storeys, cement foundation, solid brick construction, felt and gravel roofing.

Sorting cases for post office. Dominion Government, Dept. Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Berlin Interior Hardwood Co., Berlin, Ont. 500 cases at $16.50 each.

Vancouver, B.C.
Electric elevators, customs examining warehouse, cost $10,500, Dominion Government, Dept. Public Works. Secre-

tary. R. C. Desrochers, Ottawa. General contractors, P. E. Harris & Company, Ltd., 445 Granville street.

Wetaskiwin, Alta.

Post office fittings, cost $3,801. Dominion Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, J. T. Schell Company, Alexandria, Ont.

Business Buildings and Industrial Plants

Alberni, B.C.

Dairy and barn, cost $25,000, for the Alberni Land Co. Architects, Jennings & Boulanger, 322 Sayward Bldg., Victoria, B.C., are preparing plans.

Brandon, Man.

Warehouse and oil tanks, cost $16,600, the Canadian Oil Companies, Ltd., Levis street, Winnipeg. Will erect plant and six large storage tanks. Site purchased. Tanks already ordered.

Chatham, Ont.

Warehouse, cost $5,000, for A. B. McCoig, 62 Market Bldg. 40 x 50, frame and brick construction. Plans in progress.

Coquitlam, B.C.

Business building, cost $15,000, Fifth ave. and Broadway, for the Goddard Mercantile Co., 123 Pender street west, Vancouver. Architects, The Coquitlam Construction Company. Two storeys. Plans in progress.

Durham, Ont.

Office building. C. Ramage, proprietor "Durham Review," will obtain estimates and have plans prepared shortly. Two storeys, brick construction, office equipment required.

Fort Frances, Ont.

Hotel, cost $60,000, Portage ave. and Scott street, contemplated. To be completed before spring of 1914. Three storeys, brick and stone construction.

Galt, Ont.

The local temperance people, headed by A. R. Goldie, c/o Goldie & McCulloch, plan to erect and equip a hotel. A committee has been appointed to obtain estimates, etc.

Grimsby, Ont.

Basket factory, Elm Street, planned for Arthur Hewson, c/o Grimsby Mfg. Co. Cement foundation, white brick construction, one storey, 30 x 50. Latest machinery for manufacture of all kinds of baskets to be installed.

Hamilton, Ont.

Alterations to store, cost $5000, John St. N., for Firth Bros., 106 James St. N. Architect, J. D. Corrigan, 231 Catherine St. N. Store fixtures and fronts required. Plans in progress.

Factory, Sherman ave., for the Mercury Mills, Ltd. Architect not yet appointed. Site has been purchased. To be built in spring.

Factories, Barton St. E., for Fritz Canning Co., Barton street. Architects, Watt & Blackwell, 125 Lister Bldg., are preparing plans.

Candy factory, East end, planned for Robert Hyslop, 151 King St. E. Architect not yet appointed. 100 x 50.

Factory contemplated for Chicago Bridge & Iron Co., Chicago, Ill; negotiating for site and plans will be prepared and building started in the spring.

Bank building, Barton and Wentworth streets, for Royal Bank of Canada, head office, Montreal. Architect, Mr. Nye, c/o Royal Bank of Canada, head office, Montreal. Two storeys, 50 x 80. Plans in progress.

Alterations to stores and apartments, cost $10,000, for Thos. Myles, Main and Hughson street. Architect, J. A. Armes, Federal Life Bldg. Plans in progress.

London, Ont.

Contemplated purchase of machinery for furniture factory for Syndicate represented by R. C. Eckert, 434 Queen's ave; have purchased site for an addition to be built later; will require machinery and equipment.

Montreal, Que.

Dairy building, St. Viateur street, planned for the Consolidated Milk Co. Secretary, W. F. Stephens, Huntingdon. Treasurer, B. W. Allan, Huntingdon. Work to start in spring. Machinery required.

Printing plant, 790 St. Lawrence Blvd., for F. Foreiere, owner of "Le Samedi," 661 St. Catherine road. 78 x 73. Plans in progress.

Store and office building contemplated, St. Catherines St. W., for Thomas B. Little, 23 Cote street, and Walter B. Strachan, 87 Linton Apartments. Architect not yet chosen. Ten storeys, 128 x 104.

Offices and stores, cost $300,000, Victoria street, for James H. Maher, Transportation Bldg. Architects, Saxe & Archibald, 59 Beaver Hall Hill. General contractor, C. E. Deakin, 11 St. Sacrament street. Sub-tenders received by contractor after January 30th. Ten storeys, 92 x 96, cement foundation, reinforced concrete, terra cotta construction, tile and maple floors, electric lighting, hot water heating, two passenger elevators, vaults, motors, generators.

Niagara Falls, Ont.

Furnace factory, two buildings, planned for the Niagara Falls Furnace Company. Interested, A. V. Davidson, Kittanning, Pennsylvania; W. R. Taylor, Aspinwall, Pennsylvania, and E. T. Williams, Niagara Falls. Site has been purchased.

Quebec, Que.

Hotel extension, Chateau Frontenac, for C. P. R. Hotel superintendent, Hayter Reid. Plans of company's architect have been approved. Further information from Benj. Allan, Asst. Chief Architect, C. P. R., Montreal.

Stratford, Ont.

Upholstering factory, cost $30,000, contemplated for C. Farquharson and F. M. Gifford. Council has approved of plans and will shortly submit by-law to ratepayers. Two storeys, reinforced concrete construction, one freight elevator, felt and gravel roofing.

St. Marys, Ont.

Planing mill addition planned for [illegible] Royal, Station street. New woodworking machinery required, saws, planers, etc.

Strathroy, Ont.

Auto factory, cost $75,000, for Royal Auto Co., J. G. Dunn, c/o Cameron, Dunn Co. Architect, David Henry, c/o Mr. J. G. Dunn. Machinery and equipment to be purchased. Two storeys, 400 x 200, white brick and cement construction, brick and cement foundation, maple floors, shingle, felt and gravel roofing, transmission and hydraulic machinery. Plans in progress.

St. Thomas, Ont.

Remodelling establishment of Queen Tailoring Co., 39 William street, Stratford. A representative is in town looking for a suitable building. Machinery and equipment required.

Saskatoon, Sask.

Hotel, cost $225,000, 23rd street and Avenue B, for J. P. O'Leary et al. Three storeys, reinforced concrete and brick construction. Plans will be prepared.

Business block planned. Butler & Byers will build on 2nd ave. between 21st and 22nd streets; frontage 35 ft.

Stratford, Ont.

Factory, Huron street, for W. M. Bricker, c/o Dom. Life Assurance Co., Berlin (Mfrs. gloves, mitts, etc.). Architect, H. S. White, Des Moines, Iowa, is preparing plans.

Sydney, N.S.

Shoe factory, cost $50,000, contemplated for Sydney Boot & Shoe Company, Ltd. Sec.-treas., Geo. W. Murphy, Prince street. Authorized capital of company $100,000. Machinery, electric dynamos, etc., required. Plans will be prepared.

Toronto, Ont.

Factory, cost $10,000, King street west, for Mason & Risch Piano Co., Yonge St. President, Thos. G. Mason. Sec.-treas., Henry H. Mason, 230 Yonge street. Architects, Bond & Smith, 19 Wellington street west. Cut stone, mill construction. Plans drawn.

Vancouver, B.C.

Office building, cost $45,000, for The Standard Trust & Industrial Company, 433 Seymour street. Architects, Braunton & Liebert, 142 Hastings street west. Four storeys, 25 x 120, concrete construction, safety deposit vaults. Site not yet decided on. Tenders to be called.

Store and apartment building, cost $132,000, Robson and Burrard street, for C. N. Davidson, 779 Burrard street. Architects, Braunton & Leibert, 142 Hastings street west. Six storeys, 85 x 120, brick and mill construction, pressed brick faced, trimmed with stone, laundry equipment required, telephones, two elevators. Tenders called.

Victoria, B.C.

The Western Hotel, 1930 Store street, is planning extensive alterations.

Business building, cost $300,000, Fort and Douglas streets. The German Canadian Trust Co. Architects, Gelland & Riley, 423 Sayward Bldg. Two storeys, fireproof construction. Plans ready.

Walkerville, Ont.

Electric motor car factory, Albert Rd., for Tate Electric Ltd., Windsor, Ont. Architect, [illegible] W. [illegible], Rowland Bldg., Detroit. Tenders received by architect until January 22nd. Two storeys, 350 x 60, concrete foundation, brick, steel and artificial stone construction.

CONTRACTS AWARDED

Chatham, Ont.

[illegible]

[illegible] 15 Wellington street.

Halifax, N.S.

Bank, cost $[illegible], Gottingen street, for Royal Bank of Canada. Architect, S. P. Dumaresq, St. Paul Bldg. General contractors, [illegible] & McDonald, 59 [illegible] street. Plumbing, Day & Kinsman, [illegible] Cornwallis. One storey, 40 x 70, freestone front, reinforced concrete [illegible].

Hamilton, Ont.

Store, York street, for J. Hewitt, Brantford. General contractor, J. Dudley, Rebecca street. Store fixtures and fronts, plate glass.

Store and apartments, alterations, cost $5,000, for James H. Stewart, 14 John St. N. Architect, Stewart McPhie, Bank of Hamilton Bldg. General contractor, H. [illegible], 41 Queen street north. Three storeys, pine floors, felt and gravel roofing.

Macleod, Alta.

Cold storage, cost $3,000, 14th street, for the Calgary Brewing & Malting Co., East of Elbow street, Calgary, Alta. Architect and general contractor, C. T. [illegible], Calgary. Two storeys, 34 x 34, cement foundation, frame construction.

Montreal, Que.

Store, cost $4,500, alterations, 237 St. James street. Architects, Hutchinson, Wood & Miller, 50 Royal Insurance Bldg. General contractors, J. & W. Morrison, 55 Latour. Heating and plumbing, Jno. Gordon, 301 St. Antoine. Four storeys, stone foundation, stone construction.

Extension to factory, cost $2,800, 25 Cote street, for Canada Paper Bag Co., 25 Cote street. Architect, W. S. Wright & Son, 204 St. James street. General contractors, Stevenson Construction Co., 16 McGill College ave. One storey addition, 42 x 42, solid brick construction, tar and gravel roofing.

Store and residence, cost $3,500, for Bernadine Defrancesce, 2968 Clarke St. Three storeys, 27 x 40, solid brick construction, stone foundation, felt and gravel roofing.

Extension to factory, cost $7,000, Atwater ave. Owner and builder, Wm. Rutherford, 425 Atwater ave. Three storeys, 40 x 90, cement foundation, brick construction. Foundations in.

St. Catharines, Ont.

Knitting factory, cost $10,000, St. Paul street, for Warren Bros., 215 St. Paul street. Architect, Thos. H. Wiley, 109 St. Paul street. General contractors, Newman Bros., 75 St. Paul street. 3 storeys, 140 x 40, stone foundation, brick construction; electric motors, machinery required.

Toronto, Ont.

Factory, cost $60,000, King, west of Spadina ave., for M. & L. Samuel Benjamin Co., 421 King street west. Architects, Burke, Horwood & White, 28 Toronto street. General contractors, Holtby Bros., 61 Hepbourne street. Carpenter, W. B. Graham. Iron and steel, Reed & Brown, 63 Esplanade E. Roofing, W. E. Dillon Co., Ltd., 78 Richmond street east. Steel sash, Henry Hope & Son, Ltd., 45 King street west. Plastering, Duckworth Bros., 119 Huron St.

Vancouver, B.C.

Store, cost $16,000, for Powiss & Boughton, 334 Granville street. Architect, J. W. Keagey, 821 Pender street west. General contractors, Coffin & McLennan, 1701 Broadway street west. Two storeys, brick construction. Plumbing and heating contract let.

Store and office building, cost $52,000, Granville and Heimcken streets, for Mr. Jas. Borland, 1934 Nelson street. Architects, Russell, Babcock & Rice, 837 Hastings street east. General contractors, Mr. James Layfield, 1024 Broadway west. Four storeys, 44 x 120, pressed brick construction.

Stores and apartment house, cost $145,000, for W. J. Bowser and G. I. Wilson. Architects, Parr, MacKenzie & Day, 570 Granville street. General contractor, E. J. Ryan, 768 Granville street. Four storeys, 85 x 120, brick and mill construction, pressed brick faced, trimmed with stone.

Residences

Battleford, Sask.

Residence, cost $4,000, for Geo. H. Bond. Architects, Stephenson, Evans & Fillingham, Main street, North Battleford. Two storeys, 26 x 30, brick veneer construction. Plans drawn.

Brockville, Ont.

Residence, cost $6,000, Water street, for S. J. Kilpatrick, Brockville. Plans in progress.

Chatham, Ont.

Residence for Thomas Manning, Ingram street. Two storeys, 25 x 38, cement block construction. Plans in progress.

Leamington, Ont.

Parsonage, cost $4,000, for Methodist Congregation. Two storeys and basement, 30 x 35, brick construction, cement foundation. Plans in progress.

Montreal, Que.

Two residences, cost $14,000, Outremont, St. Catherine Road, for M. Normandin, 171 Notre Dame E., Montreal. G. A. Monnette, 97 St. James street, Montreal. Two storeys, 50 x 50, pressed brick construction, stone foundation. Tenders received by architect after Jan. 20th.

Ottawa, Ont.

Two residences, cost $5,000, Lewis, for O. K. McDonald, 253 Bell. 20 x 15, 30 x 30, stone foundation, brick veneer construction. Plans in progress.

Port Elgin, Ont.

Residence, cost $3,500, for Alex. Vandrich. 1½ storeys, white brick. Plans in progress.

St. George, Ont.

Residence, cost $3,500, for Alex. Howell. 1½ storeys, white brick, cement foundation. Plans in progress.

Saskatoon, Sask.

Apartment block, cost $50,000, Princess and 9th streets, planned for Mayor F. E. Harrison. Two storeys, 50 x 140. To be equipped in the most modern fashion.

Toronto, Ont.

Residence, cost $3,500, Indian road, for F. A. Ransome, 210 Westminster ave. 2½ storeys, 28 x 48, brick foundation, brick construction. Plans drawn.

Residence, cost $7,000, Playter Blvd., for Jas. W. Young, 21 Danforth avenue. Architect, James Thompson, 43 Victoria street. Tenders received by owner. 2½ storeys, 20 x 35, brick and cut stone construction, brick foundation.

Residence, cost $2,800, W.S. Ridley Gardens. Owner and builder, John S. Laxton, 235 Sorauren ave. Two storeys, brick construction and foundation. Plans drawn.

Windsor, Ont.

Three residences, cost $12,000, Hall ave., for Frank Carson, c/o The Carson House. Architect not yet chosen. 1½ storeys, white and red brick construction, cement foundation.

Winnipeg, Man.

Residences, Windsor Park, Gunn & Batten, 245 Notre Dame ave. Will erect several residences costing from $5,000 up.

CONTRACTS AWARDED

Montreal, Que.

Residence, cost $5,000, Guifford, for Dupuis & Poirier, 1256 Galt street. Builder, Vetos St. Andre Co., c/o owner. Two storeys, 75 x 60, cement foundation, brick construction, felt and gravel roofing.

Two residences, cost $8,950, Beaubien, for Duke Dunn, Lachine Rapids. Architect, A. F. Dunlop, Lindsay Bldg., St. Catherine street. General contractors, W. A. Wood Construction Company, 246 Pine ave. Three storeys, 50 x 74, cement foundation, pressed brick construction, felt and gravel roofing.

Residence, Pelequin. Owner and builder, A. R. Billet, 5470 La Jennesse ave. Two storeys, 20 x 32, brick, cement foundation, felt and gravel roofing. Foundations in.

Residence, cost $5,000, Cote St. Joseph, for Seraphim Gayer, 7 Cote St. Joseph. Builder and general contractor, H. Groulx, St. Lambert. Two storeys, 29 x 30, solid brick construction, felt and gravel roofing, cement foundation. Foundations in.

Residence, cost $4,500, Notre Dame W., for Zenon Legault, 218 Mazarin St. Builder, Gus Meine, 218 Mazarin street. Three storeys, 25 x 40, stone foundation, solid brick construction, felt and gravel roofing. Foundations in.

Residence, alterations and extension, cost $8,000, Montcalm, for B. Letendre, 12 Carrie St. Louis. Architect, E. P. Fleourval, 793 Henri Julien. General contractor, Wm. Brown, Marie Anne. Three storeys, 28 ft. 9 in. by 88 ft., cement foundation, brick construction, felt and gravel roofing.

Residence, cost $2,500, Casgrain. Owner and builder, Denis Magnan, 2918 St. Dominique. Three storeys, 50 x 76, brick, cement foundation, felt and gravel roofing. Foundations in.

Residence, cost $2,500. Owner and builder, Peter Martin, 1225 Poudriere street. Two storeys, 22 x 44, cement foundation, brick construction, felt and gravel roofing. Foundations in.

Ottawa, Ont.

Residence, cost $3,800, Bell street. Architect and builder, C. J. Stata, 160 Turner street. 20 x 37, cement foundation, brick veneer construction.

Quebec, Que.

Residence, cost $3,000. Owner and general contractor, L. P. Cote, 88 Artillery street. 2 ½storeys, 30 x 40, brick, stone foundation. Work being done by day labor.

Toronto, Ont.

Four pair residences, cost $20,000, W. S. Woodville ave., for Hannah J. Cummings, 252 Conduit street. Builder, J. M. Cummings, 252 Conduit street. Two storeys, stone foundation, brick construction, felt and gravel roofing. Plans drawn.

Two residences, cost $5,000, W. S. Arundel ave. Owner and builder, C. Curt, 79 Arundel ave. Brick construction and foundation, felt and gravel roofing.

Pair residences, cost $5,000, Oakwood Thorne Cres. Owner and builder, Wm. Law, 69 Millicent street. 2½ storeys, brick construction, brick foundation, shingle, felt and gravel roofing.

Residence, cost $3,500, Hain ave., for G. A. Nelson, 307 Crawford street. Builder, W. J. Spence, 118 Symington ave. Architects, Edwards & Saunders, 28 Toronto street. Brick construction, brick foundation.

Vancouver, B.C.

Apartments, cost $30,000, Alberta and Sixth streets, for W. G. Elliott, c/o architect. Architect, J. Y. McCarter, North West Trust Bldg. General contractors, the Dominion Construction Co., 1058 Nelson street. Two storeys, 66 x 66, pressed brick and mill construction.

Winnipeg, Man.

Residence, cost $3,800, Agnes street. Owner and general contractor, D. Main, 659 Agnes street. Two storeys, 22 x 30, stone foundation, frame construction.

Residence, cost $4,500, Lipton street. General contractors, Randle, Cross & Hancox, Nanton Bldg. Two storeys, 30 x 35, stone foundation, frame construction. Work will be started as soon as weather permits.

Residence, cost $4,000, for A. E. Elinthorpe. General contractors, Randle, Cross & Hancox, Nanton Bldg. Two storeys, 30 x 32, stone foundation, frame construction. Work will be started as soon as possible.

Power Plants, Electricity and Telephones

Amqui, Que.

Electric lighting plant planned by Municipal Council. Further information from secretary of Municipality. Machinery and equipment required.

Calgary, Alta.

Gas main. Clerk, J. M. Miller. Engineer, J. T. Child. The city council contemplates constructing municipal trunk gas main from the Bow Island gas fields to Calgary, a distance of 200 miles.

Edmonton, Alta.

Extension to gas mains planned by city council. Clerk, F. M. C. Crosskill. Engineer, A. J. Latornell. Estimates for 1913 include 20 miles of steel pipe, $14,858; 1,000 services, $25,000; also $185,000 for general work.

Essex, Ont.

Hydro electric system planned by Town Council. Further information from Mayor, Dr. Bowie.

London, Ont.

Contemplated purchase of machinery and equipment for Chisholm Dunn Telephone Appliances, Colborne and Pall Mall streets, required for manufacturing telephones, receivers, transmitters, etc., also stock required in manufacture of brass and nickel goods, woodwork, rubber and wiring, batteries.

Commissioners will shortly consider matter of installing electric lighting system in Ward 5. Mayor, C. M. R. Graham. Engineer, H. J. Glaubitz. Chairman of Commissioners, Philip Pocock.

Montreal, Que.

Alterations to plant for Montreal Light, Heat & Power Co., Craig street. Architect is owner. General contractors, D. G. Loomis & Sons, St. Patrick ave. Two storeys, 186 x 186, repairs to brick walls, new steel, brick construction.

Moose Jaw, Sask.

Electrical work, cost $185,000, planned by city council. Clerk, W. F. Heal. The requirements for 1913 include a 1,500 kw. turbo condenser, two 500 h.p. boilers; two stokers, economizer and draft equipment, extension to coal bunkers, foundations and brick work, coal weights, Lea feed water recorder, air pump, steam piping. Incidentals, line extensions and street lighting.

Montreal, Que.

Telephone and electric light wiring, cost $5,000,000 (underground), St. Catherine street, planned. Engineer, Geo. Janin, City Hall. Tenders received by Secretary, L. N. Senecal, after February 1st.

Swift Current, Sask.

Gas wells planned by town council. Mayor, A. W. Snider. By-law passed to provide funds.

Miscellaneous

Calgary, Alta.

Fire apparatus, cost $40,000, planned by city council. Clerk, J. M. Miller. 1 motor hook and ladder truck; 1 motor hose waggon; 1 motor combination engine and hose waggon; 1 motor chemical and salvage car; 1 50-gal. chemical tank; 50 alarm boxes. Tenders will be called shortly.

Moose Jaw, Sask.

Fire apparatus, cost [illegible], planned by City Council. Clerk, W. F. Heal. Commissioners' estimates include re-modelling alarm system, building to contain central alarm system, one new [illegible] for same, one horse-drawn ladder truck, one 75-ft. motor driven serial ladder; 1 motor driven combination low pressure and 1 high pressure wagon; motor driven, triple combination wagon; 2,500 ft. of high pressure hose; 2,500 ft. of standard size hose; sundry equipment for installing high pressure [illegible]

Ottawa, Ont.

Re-erection and completion of Lobnitz rock breaker, cost $15,950. Dom. Government, Dept. of Pub. Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Thompson Bros., [illegible] N.S.

Hopper scows, Dominion Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by secretary until January 27th for construction of two steel hopper scows, each 500 yards capacity. Specifications at offices of T. H. Schwitzer, Mechanical Superintendent, Birks Bldg., Ottawa; J. G. Sing, Dist. Engr., Confederation Life Bldg., Toronto; Collectors of Customs, Kingston and Collingwood; C. E. W. Dodwell, Dist. Engineer, Halifax, N.S.; H. H. Donnelly, Supt. of Dredges, St. John, N.B., Dept., Ottawa, and MacLean Daily Reports, Ltd., Toronto and Montreal.

Victoria, B.C.

Fire apparatus contemplated by City Council. Clerk, Wellington J. Dowler. Fire chief Davis recommends purchase of the following in his report, one large 80 h.p. motor hose wagon with capacity of 2,500 feet of 2½ inch hose, one 80 h.p. tractor for engine No. 2. He also recommended erecting a 2-storey fireproof building to house the signal system at headquarters station and new boiler for the steam unit at the salt water pressure system, Herald street.

Business Notes

Brantford, Ont.

Brantford Cordage Company's factory burned. Manager, Chas. L. Messecar. Loss to building, $10,000; insurance, $4,000. Contents, $110,000. Insurance, $88,500.

Edmonton, Alta.

Reed's Bazaar destroyed by fire; loss $11,000. Two storeys, frame construction. Partially covered by insurance. Will rebuild.

Iberville, Que.

Roundhouse of Quebec, Montreal & Southern Railway Co., 35 St. Nicholas street, Montreal, burned; loss $6,000. Will rebuild.

Moncton, N.B .

Plant of the Times Printing Company burned. Loss about [illegible]

Montreal, Que.

Paper factory of the Hughes-Owens Co., Ltd., 237 Notre Dame street west, burned. Loss $10,000.

Petrolia, Ont.

The Petrolia Valve Cap Factory burned. Will rebuild. New gas engine, dies, presses, general tools, leather for making valves for oil pumps and pumping outfits required.

Portage la Prairie, Man.

[illegible] destroyed by fire. Loss [illegible]

St. Alexander, Que.

Store and residence owned by S. Noiseux destroyed by fire. Loss $12,000, partly covered by insurance. Will rebuild.

Saskatoon, Sask.

The Western [illegible] Company's factory burned; loss $25,[illegible] Building will be rebuilt.

Truro, N.S.

[illegible] Prince street, burned; loss $6,000. Insurance $1,000. Will rebuild

Continued from page [illegible]

Tenders and For Sale Department

Tenders Wanted

Tenders will be received by the undersigned [illegible] 3rd day of February, 1913, for the erection and completion of the new Public Library Building at Mount Forest. Tenders may be given for the whole or any parts of the work.

The lowest or any tender not necessarily accepted. Plans and specifications may be seen at the offices of Mr. George Gray, architect, Harriston, and of the undersigned at Mount Forest.

The party whose tender is accepted will be required to furnish security for the due carrying out of the contract.

M. O. MACGREGOR,
Secretary, Public Library Board.
Mount Forest, Jan. 15, 1913. 4-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope "Tenders for Valves," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following valves, F.O.B. Port Arthur:—

24-in. Gate Valves, equipped with operating gears	30
12-in. Gate Vales, without gears	9
24-in. Check Valves, with 3-in. by-pass ..	2

Specifications can be seen at the office of the City Engineer, Port Arthur, or the office of the Contract Record and Engineering Review, Toronto, Ont.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.
The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur,
December 28th, 1912. 1-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope, "Tenders for Lapwelded Steel Pipe," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following Lapwelded Steel Pipe, F.O.B. Port Arthur:—

24-in. Pipe, 5/16-in. metal, Bell & Spigot joints, 40,200 lineal feet.
24-in. Pipe, 5/16-in. metal, flanged joints, 2,700 lineal feet.
24-in. Pipe, ¼-in. metal, flanged joints, 2,700 lineal feet (Alternative)
12-in. Pipe, 3/16-in. metal, Bell & Spigot joints, 6000 lineal feet.

Also specials and flexible joints for the above, as per list furnished with the specifications.

Specifications can be seen at the office of the Contract Record and Engineering Review, Toronto, or the office of the City Engineer, Port Arthur.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur.
December 28th, 1912. 1-5

CITY OF MOOSE JAW
SASKATCHEWAN

Tenders for Electrical Machinery

Sealed tenders marked "Tenders for turbo-generator" will be received by the City Commissioners, Moose Jaw, Sask., up to 12 o'clock noon on **Monday, February 10th, 1913**, for the manufacture, supply, delivery and erection of one 1,500 kw. steam turbine and generator.

Specifications and general conditions may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw; The Commercial Intelligence Branch, Board of Trade, 73 Basinhall street or London Chamber of Commerce, London, England.

The lowest or any tender not necessarily accepted.

A. W. MAYBERY,
L. W. RUNDLETT, Commissioners.
W. F. HEAL,
2-4

PROVINCE OF QUEBEC

Department of Roads
QUEBEC

Sealed tenders, addressed to the undersigned, and endorsed "Tenders," will be received at this office until 4 p.m. on **Monday, January 27th, 1913**, for:

1.—Grading of about 155 miles of road between Saint Augustin, Co. Portneuf, and Charlemagne, Co. L'Assomption.

2.—Construction of culverts and small bridges on the same road.

3.—Paving of about 30 miles of road in macadam or concrete or bituminous macadam pavement between Charlemagne, Co. L'Assomption, and Berthier, Co. Berthier.

Each tender must be accompanied by an accepted cheque on a chartered bank payable to the order of the Honorable the Minister of Agriculture and Roads, equal to a certain amount of the tender, which will be forfeited if the persons tendering decline to enter into a contract when called upon to do so. If the tender be not accepted the cheque will be returned. The amount of such cheques, for each of the three items above mentioned is indicated in "Information for proposers." This information will be supplied on demand.

Tenders may be made for the three items or for any item separately.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signature, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

The Department does not bind itself to accept the lowest or any tender.

By order,
B. MICHAUD,
Deputy Minister of Roads.
Quebec December 24th, 1912.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department. 2-4

Sealed tenders addressed to the undersigned, and endorsed "Tender for Interior Fittings, Post Office, Port Perry, Ont.," will be received until 4 p.m. on **Monday, February 3, 1913**, for the work mentioned.

Tenders will not be considered unless made upon forms supplied by Department and in accordance with conditions contained therein.

Plans and specifications to be seen on application to Mr. W. L. Parrish, Clerk of Works, Port Perry, Ont.; Mr. T. A. Hastings, Clerk of Works, Postal Station F., Toronto, Ont. and at the Department of Public Works, Ottawa.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender.

By order,
R. C. DESROCHERS,
Secretary.
Department of Public Works,
—33582. Ottawa, Jan. 16, 1913. 4

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors and manufacturers read the "Contract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect.

No extra charge is made for filing plans at one or all four offices.

Contract Record and Engineering Review

Montreal—B34 Board of Trade.
Toronto—220 King Street West.
Winnipeg—Commercial Travellers' Bldg.
Vancouver—429 Pender Street.

Sealed tenders addressed to the undersigned and endorsed "Tender for Interior Fittings, Post Office, Uxbridge, Ont.," will be received until 4 p.m., on **Monday, February 3, 1913**, for the work mentioned.

Tenders will not be considered unless made upon forms furnished by Department and in accordance with conditions contained therein.

Plans and specifications to be seen on application to Mr. John Park, Clerk of Works, Uxbridge, Ont.; Mr. T. A. Hastings, Clerk of Works, Postal Station F., Toronto, and at the Department of Public Works, Ottawa.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender.

By order,
R. C. DESROCHERS,
Secretary.
Department of Public Works,
—33419. Ottawa, Jan. 16, 1913. 4

FOR SALE SCREENING PLANT

One Rotary Screen, 30-in. x 7-in. Perforations 1-in. to 2½-in., with extra plates for various sizes.

One Rotary Screen, 32-in. x 6-in. Perforations 1-in. to 2-in., with extra plates for various sizes.

One Double Deck Whip Ball Shaker Screen, American Road Machine make and adapted for screening coarse sand and plaster sand.

This plant is practically new. One month in use. Capacity 35 to 40 tons per hour. Our reason for selling, capacity not large enough. Excellent plant for party requiring output of 300 to 400 tons per day. Reply to National Sand & Material Company, Limited, Welland Ont.

4-6

CITY OF VANCOUVER

Tenders for Georgia-Harris Bridge

Tenders will be received by the undersigned up to **Thursday, January 30th, 1913**, at 3 p.m., for the construction of Georgia-Harris Viaduct.

Plans and specifications, and form of tender may be obtained at the office of C. A. P. Turner, Engineer, room 424 Vancouver Block City, or plans may be seen at the office of the City Engineer, City Hall.

A deposit of $50 will be required on plans given out.

A deposit of 2½ per cent. of the amount of the contract must be made with each tender, by marked cheque payable to the City Treasurer.

The lowest or any tender not necessarily accepted.

Wm. McQUEEN, City Clerk.

City Hall, Vancouver, B.C.,
December 21, 1912.

3-4

Derrick Wanted

WANTED—¾-ton derrick; must be in good working order. State price. Reid & Brown, 63 Esplanade East, Toronto, Ont.

3-4

Sealed tenders addressed to the undersigned, and endorsed "Tender for Montreal, P.Q., Postal Station 'H,'" will be received at this office until 4 p.m. on **Monday, February 10, 1913**, for the construction of the building mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of Messrs. Cox & Amos, architects, 78 Crescent street, Montreal, Que., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c. of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, January 11, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—31694.

3-4

Parkhill Water Works

Tenders will be received until **February 6th, 1913**, for Hydrants, Valves, Deep Well Pump and Engine, Excavation and Pipe-laying.

For all information apply to

BOWMAN & CONNOR,
Civil Engineers,
Berlin Ont.

Berlin, Ont., Jan. 18, 1913.

4-4

Plans Wanted

Architects are requested to submit, free of charge therefor, to the undersigned on or before **February 17th, 1913**, plans and specifications with estimated cost for one-storey and two-storey 10-room school building with assembly room to be erected in the Town of Brampton in the County of Peel.

Dated January 17th, 1913.

T. J. BLAIN,
4-6 Sec.-Treas. Brampton Public School Board.

FOR SALE

Timber on Limits

of the

Bellerive Lumber Co., Ltd.

near Nominingue, P. Q.

also

SAW MILL, YARDS AND PLANT, COMPANY'S HOUSES AND SIDING

For information apply to Bellerive Lumber Co., Ltd., 212 McGill St., Montreal.

4

CITY OF REGINA, SASK.

REGINA MUNICIPAL RAILWAY.

TENDERS

FOR

TRACK and TROLLEY MATERIAL

Sealed tenders registered, and plainly marked on the outside of the envelope "Tenders for the Supply of Street Railway Materials," and addressed to the City Commissioners, Regina, Sask. Canada, will be received up to noon **Monday, the 24th day of February, 1913**, for the supply of:—

CONTRACT D.

1100 long tons street railway steel 7-in. Tee rails, Lorain section 80/335.
1550 pairs 6-hole 26-in. splice bars for Lorain rail section 80/335.
1040 long tons street railway Tee rails, 60 lb. A.S.C.E. section.
2000 pairs 4-hole 24-in. angle bars for 60 lb. A.S.C.E. steel rails.
10000 track bolts and nuts, 3½-in. x 1-in., oval heads, hexagon nuts.
9000 track bolts and nuts, 3¼-in. x ¾-in., oval heads, hexagon nuts.
10000 split lock nut washers for 1-in. track bolts.
10000 split lock nut washers for ¾-in. track bolts.
660 kegs (each keg 200 lbs.) standard railroad spikes, [illegible]

CONTRACT E.

5400 4/0 standard copper rail bonds, 10 in. C.C.
3600 4/0 standard copper rail bonds, 13 in. C.C.
630 4/0 solid copper rail bonds, 62-in. C.C.
60 4/0 solid copper rail bonds, 72-in. C.C.

CONTRACT F.

10000 standard sawn square B.C. fir railroad ties, 6-in. x 8-in. x 7 ft.
35000 standard sawn square B.C. fir railroad ties, 6-in. x 8-in. x 8 ft.
1250 Western cedar poles, 30 ft. long, 7-in. top

CONTRACT G

20000 barrels Portland Cement

CONTRACT H.

21 miles 2/0 hard drawn trolley wire.
12 miles 4/0 D.B.W.P. 19 stranded copper wire.
4 miles 2/0 D.B.W.P. 7 stranded copper wire.
10 miles 3/8-in. stranded soft drawn iron wire.

CONTRACT J.

[illegible], Hangers, Brackets, Pullovers, [illegible], [illegible], [illegible] Crossovers, Clinch Ears, Pole Line Hardware, etc., etc.

All material to be delivered F.O.B. Regina, Freight and duty PAID.

[illegible] specifications, [illegible] and form of contract, and other particulars can be had upon application to H. Doughty, Superintendent, the Regina Municipal Railway Regina, Sask., Canada.

Persons tendering are notified that tenders will not be considered unless made on forms supplied. Forms will be mailed upon request to the Superintendent.

A marked cheque [illegible] payable to the City Treasurer [illegible] tender.

The City Commissioners reserve the right to reject any or all tenders.

R. MARTIN, Mayor.
G. A. MANTLE,
L. A. THORNTON,
City Commissioners.

For Sale

[illegible] gauge, [illegible] at Mont- [illegible] & Co., 1328 [illegible] 4-6

Special Notice to Contractors

[illegible] any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

Situations Vacant

[illegible] goods salesman to travel throughout Ontario, Manitoba Saskatchewan and Alberta, to represent large American manufacturing concern. Address Box 684, Contract Record, Toronto, Ont. 3-6

WANTED—First-class electrical salesman, experienced in selling panel boards, switchboards, meters, transformers, etc. Splendid position for good man. Apply Box 694, Contract Record, [illegible] 4-5

WANTED By a Construction Company, a first-class superintendent. Must be accustomed to handling large buildings. A thoroughly technical and practical man required. Reply, giving experience, etc., to Box 689, Contract Record, Toronto, Ont. 4-6

Two architectural draughtsmen required by Montreal architect. State age, experience and salary required. Permanent position if suitable. Contract Record, Box K. 119 Board of Trade, Montreal. 4-6

Situations Wanted

WANTED—Position with good contracting firm, by sober, industrious man, with 15 years' experience in building line. Experience and testimonials on application to Box 683, Contract [illegible] 4

To Railroad Contractors

Young Canadian wants permanent position with large firm. Experience as foreman on bridge work and rock work; as instrument man and draughtsman; has had charge of location survey, construction and maintenance. Training in bookkeeping and general business. At present is cost accountant for large manufacturing concern. References. Address Jack Butterfield, 17 Melbourne Apartments, Melbourne Avenue, Toronto, Ont. 4

Building Permits

Toronto, Ont.

Toronto Electric Light Co., 1-storey brick addition, near Louisa, on Terauley, $8,000; Toronto Electric Light Co., addition to structure, near Scott, on Esplanade, $5,000; W. S. Langdon & Son, two detached, 2½-storey brick dwelling, on 50-52 Dixon avenue, $5,500; A. & A. Grant, 2 pair 2½-storey brick dwellings, near Logan, on S.S. Garnock, $10,000; Keens Manufacturing Company, addition to warehouse, near Queen, on E. S. Spadina, $5,000; W. H. Croft, two detached, 2½-storey brick dwelling, near Castle Frank, on Dale, $10,500; P. M. Castleman, two detached 2½-storey brick dwelling, near St. Clair, on E.S. Alvin, $8,000; A. A. Larkin, 2 pair 2-storey brick dwellings, on Davenport road, $9,000; Heintzman & Co., 4-storey concrete factory, near Dundas, on Heintzman, $36,000; R. J. Hoidge, 2½-storey brick dwelling, on 53 Lonsdale avenue, $5,000; W. Dixon, 2-storey and attic brick dwelling, on 129 Garden avenue, $8,000; J. D. Young & Son, 3 pair 2-storey brick dwellings, near Bird, on Englewood, $12,000; Consumers Gas Company, 2-storey brick purifying house, near Booth, on Eastern avenue, $50,000; O. H. Sheppard, 2½-storey brisk dwelling, near Yonge street on S.S. Jackes, $15,000; A. Naylor, 2½-storey brick dwelling, on Fairview avenue, $5,000; F. W. Woolworth Company, 2-storey concrete store, on 1688-92 Dundas street, $5,000; J. M. Walker, 7 pair 2½-storey brick dwellings, corner Logan and Brown, $30,000; J. Thompson (in trust), 2½-storey brick dwelling, on 320 Russell Hill road, $12,000; L. J. Applegath, 2½-storey brick dwelling, corner St. Clair and Spadina, $13,000; H. J. Atkinson, 2½-storey brick dwelling, on 41 Hambly avenue, $5,000; Metropolitan Bank, 2½-storey brick bank, corner College and Bathurst streets, $35,000; M. E. Gardner, 2 detached two-storey brick dwellings on 2-4 Jean street, $6,000; G. S. Barber, 2 detached 2½-storey brick dwellings, near Springmount, on Rosemount,, $6,000; Steiner & Pretmon, 3 pair 2½-storey brick dwellings, near Dundas, on Annette, $12,000; J. Carlisle, two detached, 2½-sty. brick dwellings, near Conduit, on E.S. Pacific, $8,000; G. Philips, 3-storey brick apartments, on N.W. corner Brunswick and Bloor, $6,000; Crown Tailoring Company, 4-storey brick store and factory, S.E. corner College and Euclid, $30,000; A. J. Bentley, 2-storey brick theatorium, S.W. corner St. Clair and Dufferin, $15,000.

New Companies

Bloor Estates, Limited, have been incorporated with a capital of $100,000 to carry on business as a land and building company, with head office at Toronto. The provisional directors are N. D Maclean, solicitor, M. E. Robins, real estate agent, and J. J. Flint, accountant, all of Toronto.

The Streetsville Brick Company, Ltd., has been incorporated with a capital of $100,000 to carry on business as brick manufacturers and manufacturers stone, cement, etc., with head office at Toronto. The provisional directors are Edgar Vandewater, real estate agent, John Drummer, builder, and Fred. Longwell, manufacturer, all of Toronto.

Huron Trap Rock Company, Limited, has been incorporated with a capital of $100,000 to quarry, manufacture and deal in trap rock and stone, with head office at St. Ste. Marie. The provisional directors are J. H. Haining, contractor of Sault Ste Marie, Jas. Lyons, real estate agent, and Edward Kelly, contractor of Steelton, Ont.

The Burlington Realty Company, Limited, has been incorporated with a capital of $40,000 to erect buildings and deal in all kinds of building materials, with head office at Toronto. The provisional directors are M. H. Gray, clerk, Harry Chapman and Percy Witt, carpenters, all of Toronto.

The Forest Hill Homes Company, Limited, has been incorporated with a capital of $125,000 to carry on business as a general land and building company, with head office at Toronto. The provisional directors are Jas. Atchison, Grant Cooper, barristers, and J. S. Emery, stenographer, all of Toronto.

The Pickerel River Lumber Company, Limited, has been incorporated with a capital of $100,000 to carry on business as a timber and lumber merchant, saw and planing proprietors, with head office at Ottawa. The provisional directors are T. A. Beament, A. H. Armstrong, solicitors, and C. D. Henry, stenographer, all of Ottawa.

The Tagona Townsite, Limited, has been incorporated with a capital of $40,000 to carry on a general land and building business, with head office at Sault Ste Marie. The provisional directors are J. A. Furse, gentleman, D. P. McPhail, contractor, and J. A. McPhail, barrister, all of Sault Ste Marie.

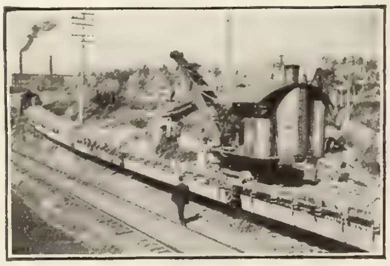
Tenders

A few dollars spent in advertising your proposals in

The Contract Record

would result in additional competition, which might save your city or town or your client many hundreds of dollars.

BROWNING
LOCOMOTIVE CRANES



saving their owners Time, Labor and Demurrage are illustrated in our latest Catalog. Write for one at once to

The Browning Engineering Co.
Main Office and Works:
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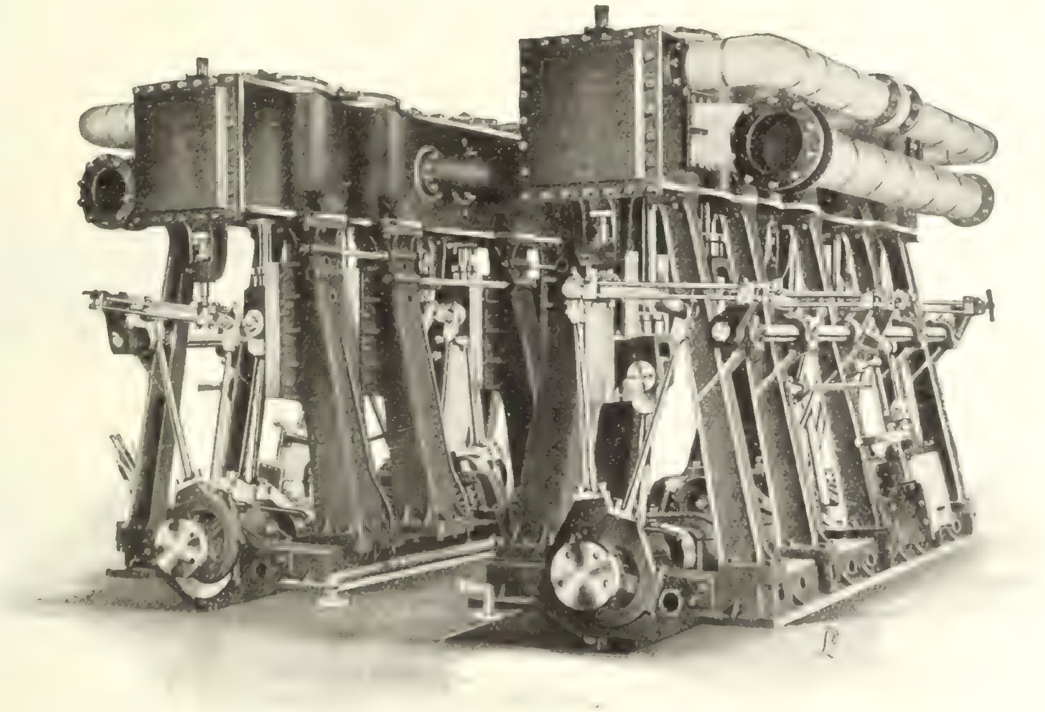
ENGINES and BOILERS



Marine Engine built for the R. & O. Nav. Co.'s Steamer "Rapids Prince."

We make Boilers of every kind for any service. Engines, Pumping Machinery and heavy Plate work. "Inglis" indicates the best in Quality, Design and Workmanship.

Write us for particulars

The John Inglis Co., Limited

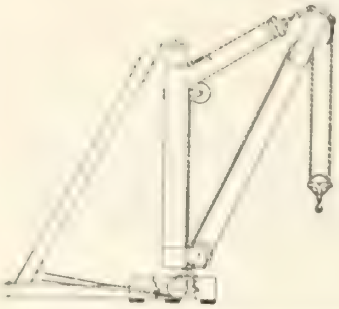
ENGINEERS AND BOILERMAKERS

14 Strachan Avenue **Toronto, Canada**

HOISTING ENGINES

DERRICKS

Horse Powers
Winches or Crabs



Standard sizes and capacities of Derricks in stock for immediate shipment

Get our catalog and prices. They will interest you—All goods guaranteed.

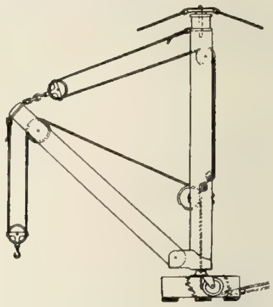
MARSH & HENTHORN

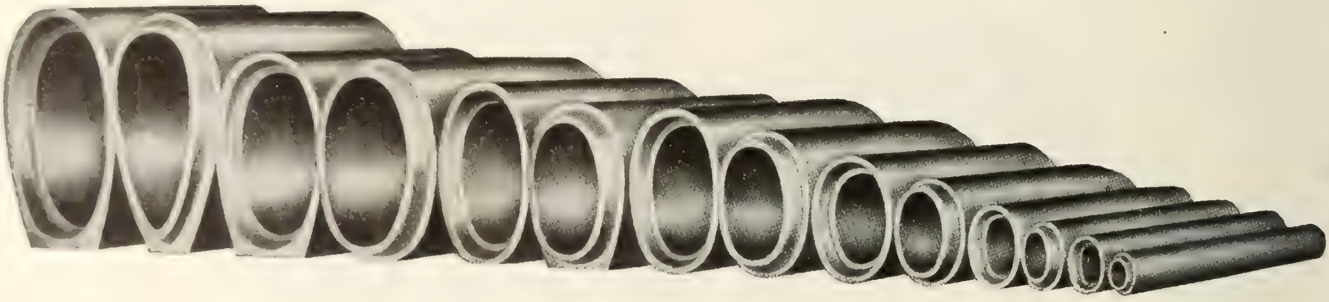
Limited

Makers of Hoisting Machinery

Belleville, Ont.

Sales Agents : MUSSENS LIMITED, Montreal





Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

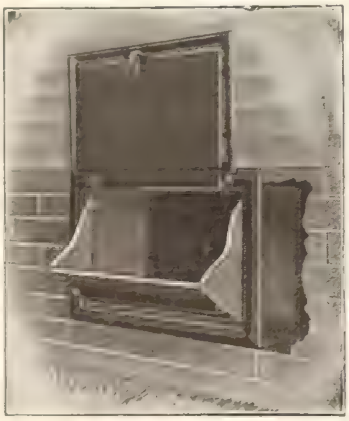
STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario



EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

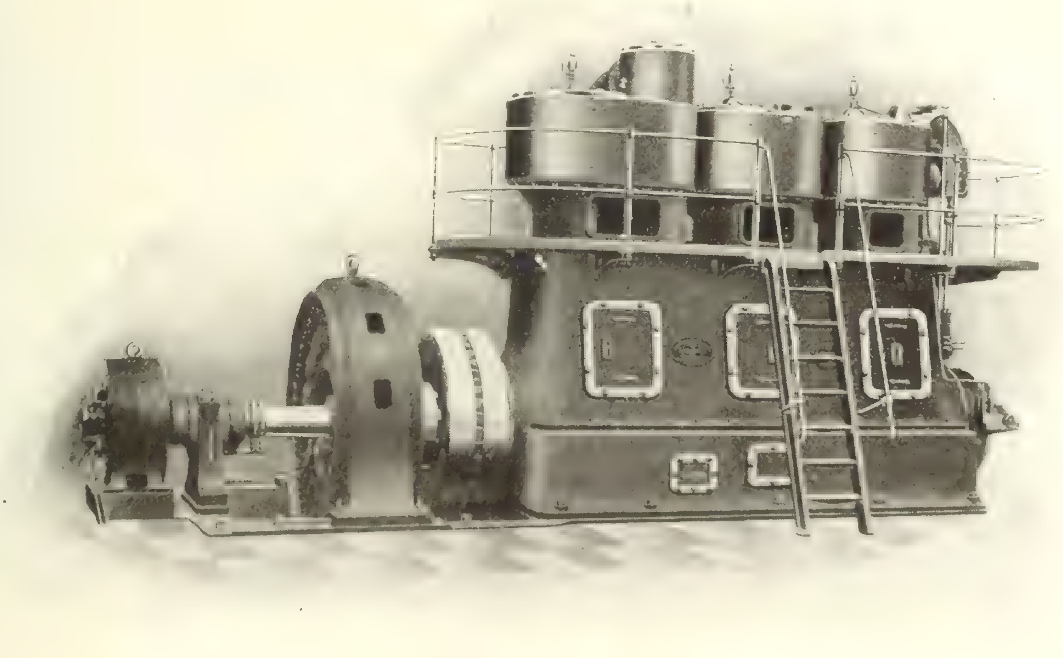
Galt, Ontario, Can.

Montreal Representative : E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

THE "BROWETT-LINDLEY"

Enclosed, quick-revolution, forced lubrication, steam engines

These engines are built by Browett, Lindley & Co., Limited, Manchester, Eng., and have established an enviable reputation in electric power and tramway plants, collieries, cotton and paper mills, steel and iron works. They are made in five different varieties to suit steam pressure and working conditions.



"Browett-Lindley" three-crank, triple expansion, forced lubrication engine, driving electric generator

Sole Agents for Canada

THE JOHN McDOUGALL
CALEDONIAN IRON WORKS CO., LIMITED

Works: Seigneurs & William Sts., MONTREAL Sales Offices; MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

Manufacturers of Boilers, [illegible] Condensers, Furnaces, Engines, [illegible] Engines,
Hydraulic Machinery, Pumps, centrifugal and reciprocating; Steam Turbines, Tanks,
Water Wheels, Water Works Plants

THE TEST

The first Creosoted Wood Block Pavement laid in America was on Tremont Street, Boston, Massachusetts, twelve years ago.

This pavement was laid to secure a test of the wearing qualities of Wood Block.

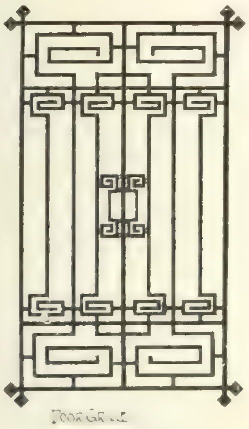
The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

The Asphalt was taken up some time ago and street newly paved.

The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

The Dominion Creosoting Co., Ltd.
Vancouver, B. C.



Window and Door Grilles

We execute Architects Designs in Wrought Iron, Bronze or Brass.

The workmanship and finish of our grill work is of high standard.

We illustrate a number of designs in our Catalogue that offer useful suggestions.

Dennis Wire & Iron Works Co.
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET

Have You Investigated Our

STEEL ROOFING FOR FLAT ROOFS ?

It is an easily laid roofing and makes a durable, fireproof and weatherproof job.

We want every Contractor and Builder to have a sample of this "Flat" Roofing, also our Illustrated Catalogue. Sent free on request.

Corrugated Iron **Metallic Shingles**
Metallic Sidings **Metallic Ceilings**
Etc., Etc.

The Metallic Roofing Co. LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.
(32)

Herringbone Lath is Stiff Lath

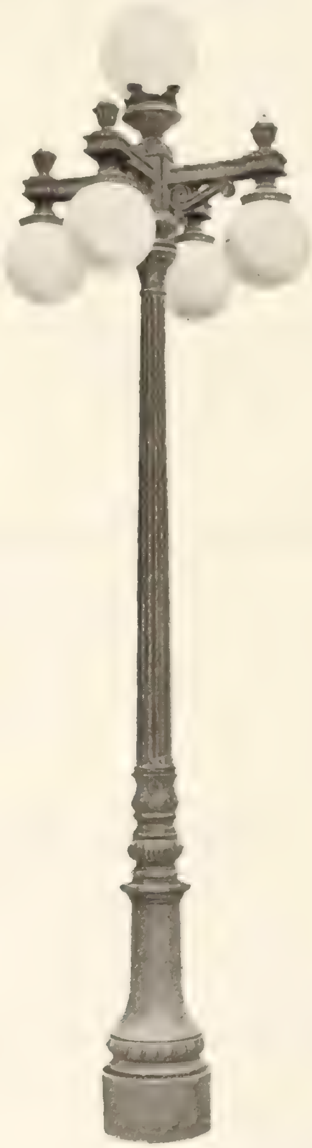
PUZZLE—
Guess which is the Ribbed Lath

It is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, *General Sales Agent*
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers

MORRIS
Street Lighting Poles



Modern Ideas In Street Lighting

Send for Descriptive Bulletin and Prices

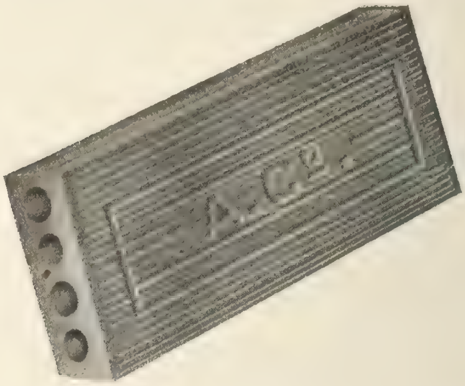
L. H. Gaudry & Co., Limited

Canadian Distributors

76 St. Peter St. - Quebec, Can.

Fireproof Wall Furring and Partitions

Before ordering the fireproof tile for that building be sure to write for particulars and prices of



Pulpstone Fireproof Gypsum Block

They are made in Canada by hand and are stronger and in every way superior to imported blocks.

More efficient than Terra Cotta—can be put up with half the labor cost, in half the time.

They are made from Gypsum Plaster, the best non-conductor of heat and cold known commercialy and will not warp, expand or split when subjected to the most extreme variations of temperature. They transmit less than 5% of the temperature on the fire side to the opposite face of the block, and resist the action of water under actual fire conditions. After a fire they require replastering on the fire side only for complete restoration. Pulpstone blocks last forever.

Write

The Alabastine Co.

Limited

Sales Office, PARIS, Ont.

Mines and Mills at Caledonia, Ontario

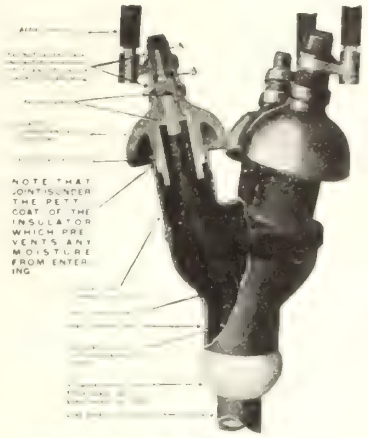
Please Address all enquiries for the City of Toronto to Alabastine Hardmortar Limited 82-88 King St. E. Toronto

Tenders Wanted

should be advertised for in the "Tenders and For Sale Department" of the CONTRACT RECORD AND ENGINEERING REVIEW. This paper is the "Tender Ad." medium of Canada and always brings bids from the reliable contractors and supply houses.

File your plans for any work on which you are inviting bids, in our offices at Toronto, Montreal, Winnipeg or Vancouver.

Contract Record
and Engineering Review
Toronto Ontario


NOTE THAT JOINT IS UNDER THE PETTICOAT OF THE INSULATOR WHICH PREVENTS ANY MOISTURE FROM ENTERING

Sectional view of 3 Conductor DOA Terminal for 2,500 Volt Service

"Standard" cable accessories

embody all the improvements suggested by over 20 years of service under varied and most exacting conditions. They were the best 20 years ago—they are the best to-day. A card will bring full information. *Write to-day.*

Standard Underground Cable Co. of Canada, Limited

Winnipeg, Man. Hamilton, Ont. Montreal, Que.
Seattle, Wash. Boston, Mass.

Manufacturers of Electric Wires and Cables of all kinds, all sizes, for all purposes, also Insulating Compounds, etc.

Engineering Works of Canada, Limited

Head Offices: New Birks Building, MONTREAL, QUE.

Three Phase Electric Locomotive

All kinds of

Mechanical and Electrical Machinery

Builders under the patents of the

Societe Alsacienne

ESTABLISHED 1826

AUTOMATIC ELEVATORS—Passenger and Freight

Simplicity Foolproof High Efficiency Patent Single Phase Motor High Starting Torque

Renfrew Lime

will make more mortar per 100 lbs. of Lime than any other kind, and will save you 75 cents a day on each bricklayer. At the end of a year your savings would pay for the lime.

The quality of "RENFREW" Lime is very superior and it will pay you to use it.

"RENFREW" the LIME of QUALITY

Jamieson Lime Company

Renfrew, Ontario

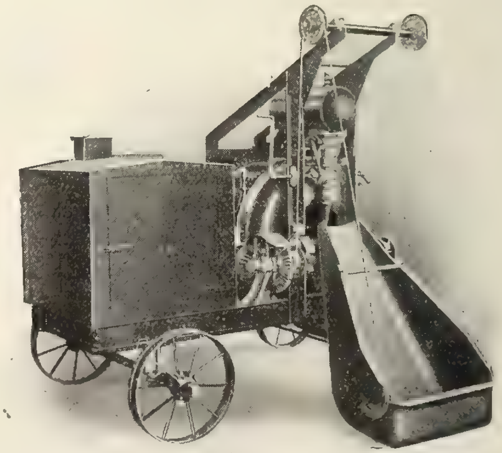
White Lime - Stone - Grey Lime - Brick - Drain Tile

On All Classes of Work KOEHRING MIXERS are mixing their way to popularity because of the Dollar Saving Qualities

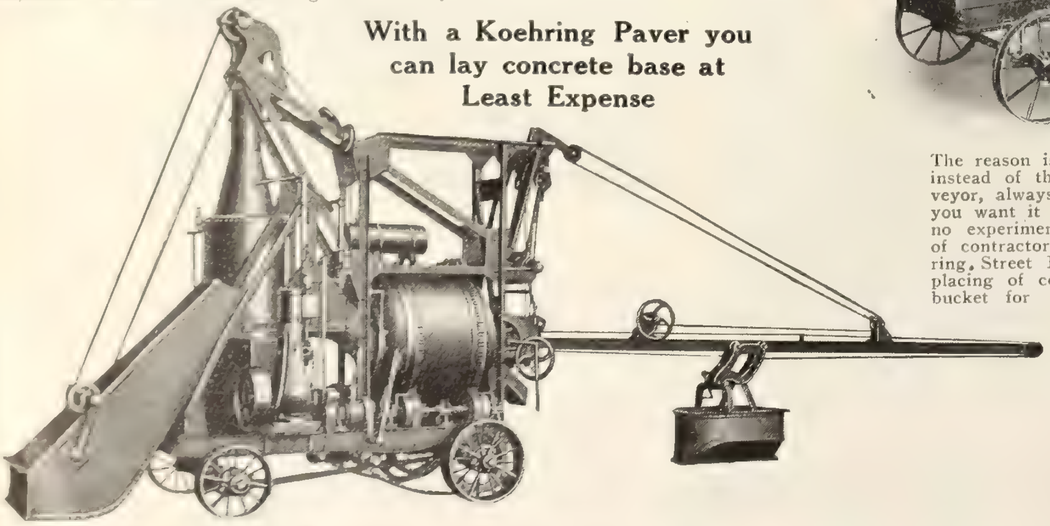
[illegible] of mixing means three times as much mixing or an equal amount of mixing in one-third of the time. There are three independent [illegible] opposed mixing actions in the Koehring drum producing thoroughness of mixing and rapidity of mixing and a uniformity of mixing, no other Mixer equals. There are also equally important advantages in the mechanical construction of the Koehring Mixer.

The heavy cast special metal Koehring drum will outlast the drum of any other Mixer. The railroad truck bearing truss and the rollers being keyed on to the axle, makes "wabbly" drums impossible.

The charging bucket raises to a nearly vertical position so that all the material will pass into the drum without pounding the bucket. There are numerous other important features in the Koehring Mixer that you should know about.



With a Koehring Paver you can lay concrete base at Least Expense



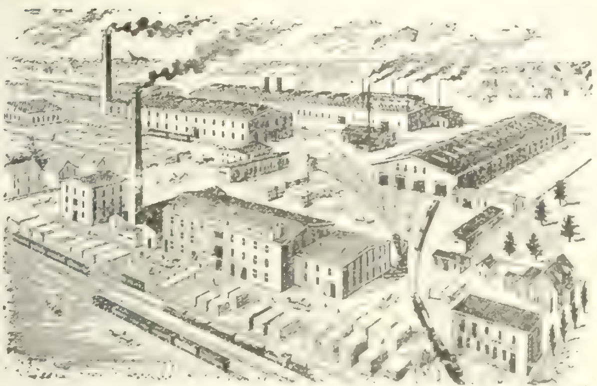
The reason is the machine conveys the concrete instead of the men, and it's a dependable conveyor, always places the concrete exactly where you want it and always dumps clean. There is no experiment about it, the records of dozens of contractors prove the economy of the Koehring Street Paving Mixer and it combines this placing of concrete with a simple charging bucket for getting material into the drum in shortest possible time and least number of men, also, it has traction drive for moving the machine along the line of work and keeping close to the material pile. This builds contractors' reputations and pays handsome profits. Aren't you interested in this reputation and profit making?

KOEHRING MACHINE CO., Milwaukee, Wis. Exclusive Sales Agent for Canada: **Canada Foundry Co., Limited**

Toronto Montreal Halifax Ottawa Cobalt Winnipeg Calgary Vancouver Nelson

Rhodes, Curry Co., Limited

Lessees



Bank and Office Fittings

SCHOOL DESKS A SPECIALTY

We manufacture all kinds of building materials, including cast iron columns, cresting, sash weights, etc.

In addition to our large stock of native lumber, we are now carrying about one million feet of foreign lumber, including oak, walnut, ebony, whitewood, basswood, red cedar, Douglas fir, mahogany, &c.

Rhodes, Curry Co., Ltd. Amherst, N. S

BRANCHES AT
Halifax Sydney

The Mixer With a Record

THE BLYSTONE HAND TRUCK MIXER

For combination shop and outside use this Hand Truck Mixer is acknowledged to be the very best on the market. It has been used on hundreds of sidewalks and foundation contracts with unqualified success. It is strongly built and so simple in design that it will never give any trouble with repairs.

Strongly Made – Well Balanced **Easy to fill – Easy to Dump**

Send for Catalogue

The Blystone Machinery Company
61 Railroad St., CAMBRIDGE SPRINGS, Pa., U.S.A.

Full line of Blystone Mixers carried in stock by
The A. R. WILLIAMS MACHINERY COMPANY, Limited
Contractors Department No. 1, TORONTO, CAN.
Sole Distributors for Canada

Durable—Fireproof—Handsome

It is very doubtful if **any** other roofing will give perfect protection for as long as will

ASBESTOSLATE

Cement Shingles

St. Agnes Church, Megantic, P.Q.

for, made of Portland Cement and Asbestos, these shingles are practically indestructable.

No other roofing can better guard your building against fire for asbestoslate Cement Shingles are, in their very nature, **absolutely** fire proof.

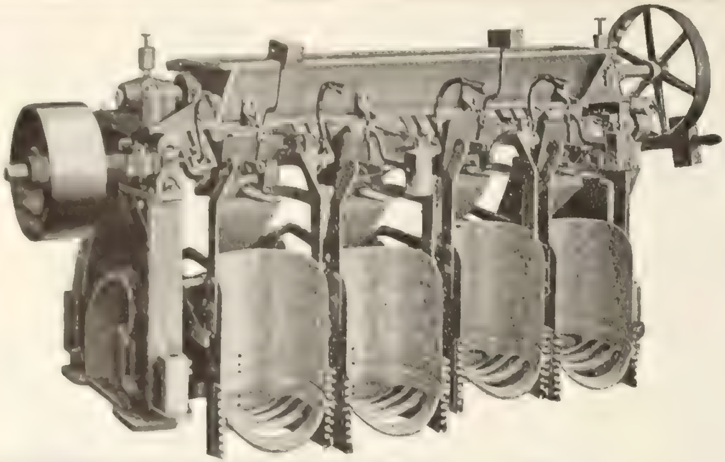
TRADE MARK
ASBESTOSLATE
ASBESTOS
SHINGLES

Scarcely any other roofing is so handsome as Asbestoslate Cement Shingles, in their soft, permanent shades of Indian Red, Newport Grey and Slate, and in plain and various fancy shapes.

No other roofing combines these three important qualities in such high degree.

Write for Booklet C.R. telling all about Asbestoslate Cement Shingles.

Asbestos Manufacturing Co., Limited
Address E. T. Bank Bldg., Montreal
Factory at Lachine, Que., (near Montreal)



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Lime Manufacturers

Let Us Pack Your Hydrate
with the Wonderful

BATES SYSTEM

also Let Us Quote You on

PAPER BAGS

of every description

The Urschel-Bates Valve Bag Co.
Toledo, O., U. S. A.
Branch Plant, Niagara Falls, Ont.

Mahan & Company

908-909 Chamber of Commerce Building
Chicago, Ill.

Block, Sawed, Planed
and Turned

Bedford Stone

Quarries and Mills
near Clear Creek, Indiana

Chicago Mill and Storage Yard:
2126-2142 So. Kedzie Ave. and C. B. & Q. Tracks

Representative, Toronto, Canada,
H. R. IVOR, Rooms 8-10, No. 34 Yonge Street

Producers of the Celebrated

**"Peerless"
Bedford Stone**

**Bedford Indiana
Limestone**

Mill Blocks
Sawed, Planed and Turned Stone

W. McMILLAN & SON

(Incorporated)

General Offices
918 Otis Building
CHICAGO, ILL.

Quarries and Mills { Bedford, Ind.
Bloomington, Ind.

THE H. & E. PATENT BALL-BEARING LIFTING JACKS

For Railway and Bridge Work, Contractors' and Builders' Use

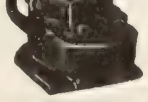
Made by practical Jack Builders. Material: best grades of malleable iron and steel Fully guaranteed as to durability and efficiency. The long even stroke of the lever together with the design and careful construction of the jack, makes it the quickest and easiest working lifting appliance on the market. Made in plain and foot-lift styles. Adapted to all classes of work where a lifting jack can be used. Sizes from 8 to 50 tons capacity now complete. Send for prices and discounts.

To any responsible Firm or Railway in Canada any of these jacks will be sent on 30 days trial.

Manufactured by

Canada Lifting Jack Co., Ltd.
(Formerly the H. & E. Lifting Jack Co.)
Waterville, Que.

Stock carried by F. H. Hopkins & Company, Montreal



Current Prices of Building Material.

BRICKS

The following are wholesale prices delivered at Toronto:—

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock Lumber—

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

Shingles—

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

Cedar Posts—Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		21 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbers' prices at Winnipeg in case lots:—

MONTREAL

	Star	D.D
25	$3 25	$4 75
40	3 45	5 25
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet, F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 ft.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.
High grade compression work, 55 and 5 per cent.
Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.
Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.
No. 4 compression bath cock .... net $1.85
No. 4½ Fuller's .... net $2.50
Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.
7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.
Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

McMYLER DERRICKS FOR SALE

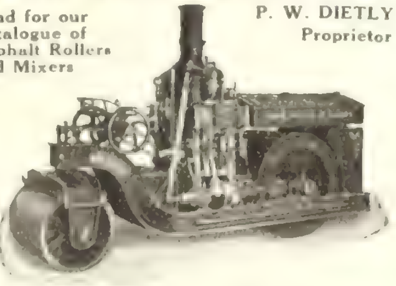
Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover buckets, two (2) marine engines, boilers, [illegible]

CLEVELAND & ERIE MACHINERY CO.
1515 Rockefeller Bldg., Cleveland, O.

ERIE MACHINE SHOPS

Send for our Catalogue of Asphalt Rollers and Mixers

P. W. DIETLY
Proprietor



"Our 20th Century Roller"
1303 Peach Street, - Erie, Pa.

The
Laurentian Granite Co.
Limited

MANUFACTURERS OF

Building Granite, Granite Setts, Curbing, Crushed Granite

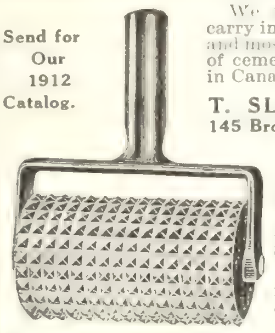
Samples Furnished and Prices Quoted on Application

Rose and Pink Granite Quarries at Staynerville, P. Que., Co. Argenteuil, on C.P.R.

Bank of Ottawa Bld'g.
334 St. James St.
Bell Tel. M. 4354
Montreal

Cement Sidewalk Tools

Send for Our 1912 Catalog.



We manufacture and carry in stock the largest and most satisfactory line of cement sidewalk tools in Canada.

T. SLACK & CO.
145 Brock Ave., Toronto

Representatives

A. Bremner, Montreal. Forbes & Van Horn, Vancouver. H.S.Howland, Sons & Co., Toronto. Winnipeg Tool & Forging Co., Winnipeg. J. H. Ashdown, Ltd., Winnipeg.

A Chance to Save on Sidewalk Tools

"Abram" Sidewalk Tools have no competitors they are the original and only automatic "Wrist Motion" long handled tools. Write at once for our special December discount offer, and catalog free. Every set sold with a guarantee.

Abram Cement Tool Co.
105 Ouellett Avenue
WINDSOR ONTARIO

J. HARVEY
CONTRACTOR
Greensville - - Ont.

Driller of Oil, Gas, Salt or Artesian Wells
Deep Wells a Specialty

20 YEARS' EXPERIENCE IN CANADIAN OIL FIELD

Contracts taken in any part of Canada. Several years experience in Artesian Wells for Municipal Water Works. Estimates or geological information cheerfully furnished.
References Given

G. Woolliscroft & Son, Ltd.

Cables, "Blizzard, London," A.B.C. Code, 5th Edition

HANLEY, Stoke-on-Trent-England

Glazed and Floor Tiles of Every Description

Terra-Cotta, Quarries "Ironstone-Adamant"

Red Floor Tiles
Best and Cheapest on the Market

☞ Tunnel under the C. P. R. R. Station Montreal, is built of Cerestized Concrete

"Ceresit" Waterproofing is a cream white paste which is incorporated in the concrete mass or cement mortar. It is put into the water used in mixing the ingredients. The water carries the Ceresit into every portion of the mass uniformly, thoroughly, and renders it absolutely water tight.

CERESIT WATERPROOFING CO.
Commercial Bank Bldg., CHICAGO.

CANADIAN BRANCHES
Douglas Milligan, Ltd., 304 University Street, Montreal.
Douglas Milligan, Ltd., 217 Confederation Life Bldg., Toronto.
Grose & Walker Ltd., 259 Stanley St., Winnipeg.
E. G. Cullen, 418 Pacific Bldg., Vancouver, B. C.
Carritte-Paterson Co., Ltd., St. John, N.B.

Ceresit Factories are located in Chicago, Unna, Westphalia, Germany, London, Paris, Vienna, St. Petersburg.

Agents Wanted in Unoccupied Territory

Ceresitized Concrete and Cement Mortar are Permanently Waterproof

and possess the highest efficiency at the lowest cost of any method of waterproofing.

No waterproofing, regardless of cost, is more efficient on important concrete engineering such as tunnels, foundations, sewers, bridges, reservoirs, dams, tanks, swimming pools, water-towers, floors, cellars, walls and roofs.

Ceresit is also applicable for use in cement mortar and will damp-proof and waterproof stucco and other exterior cement finishes.

Floors of boiler and engine room now perfectly dry, an application of Ceresit made them so.

Philadelphia, Pa., July 11, 1911.

Mr. A. T. Schreiber, Dist. Mgr., Ceresit Waterproofing Company, 1218 Chestnut Street, Philadelphia, Pa.

Dear Sir: The work you did for us in our boiler room has proven satisfactory. This, you will recall, was a very nasty job; the water was pouring into our boiler room from surrounding properties; after applying your material on the wall to a height of 6 inches we have had no further trouble and the floors of our boiler and engine are **now perfectly dry.** We are very glad to recommend your material and your workmanship.

Yours very truly,
DILL & COLLINS COMPANY.

…………… Please cut out this ……………

REMINDER

to write for Free Book "S" on how to Effectively and Permanently Waterproof Concrete and Cement Mortar.

CERESIT WATERPROOFING CO., Commercial Bank Building, CHICAGO

Orleans Filtration Plant and Concrete Building taking about 100,000 barrels of Alsen's New Cement

Alsen's Cement

was selected in 1905 for the Panama Canal in preference at equal prices and has exceeded those severe requirements. Sold under a guarantee other Portlands cannot make in good faith. Other brands have been supplied only on modified specifications.

Alsen's American Portland Cement Works
45 BROADWAY, NEW YORK

Stand Pipes and Water Towers for Corporations a Specialty

Expert Builders of

Steel Plate and Structural Iron Work

of all descriptions

Storage and Pressure Tanks of various capacities carried in stock.

Write for Quotations

The Toronto Iron Works Limited
TORONTO, ONT.

TENTS

for Engineers and Contractors

We are manufacturers of a very complete line of tents for engineers' and contractors' use and can make shipment the same day as order is received.

We also make engineers' and surveyors' clothing, in fact we can fit you completely for camp and survey trips.

Send for our catalogue
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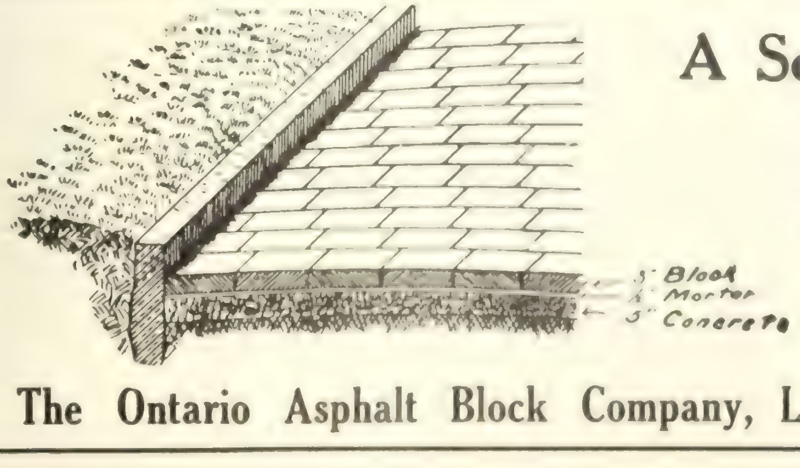

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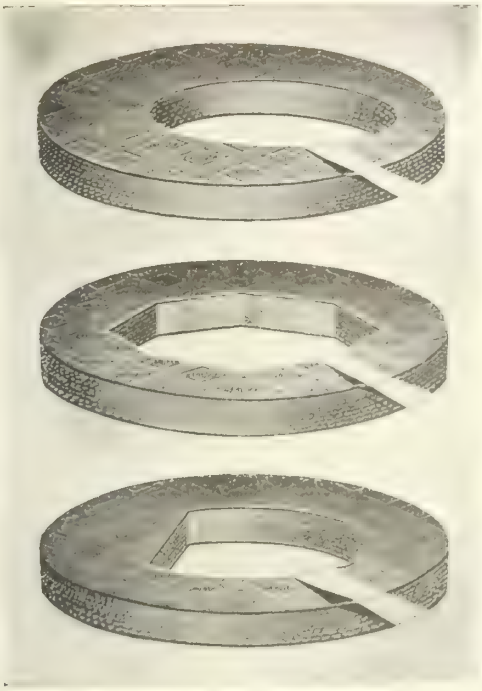

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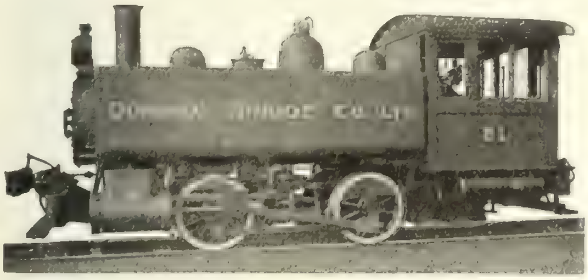

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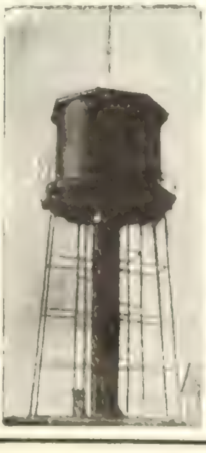

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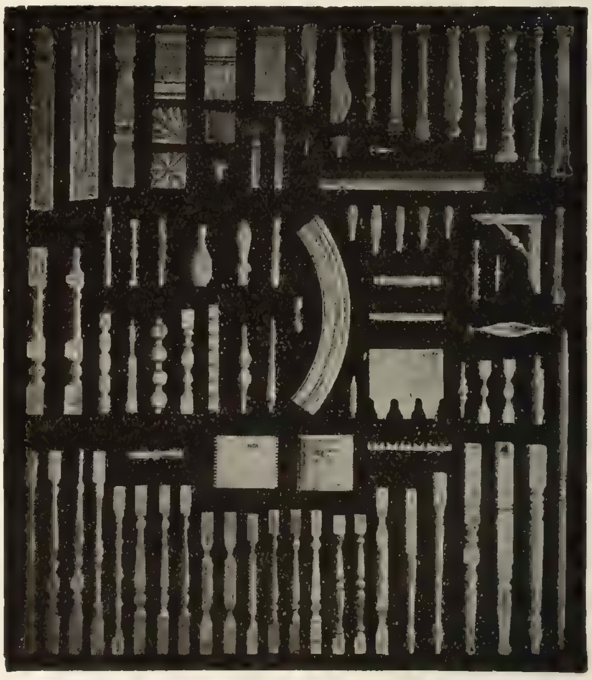

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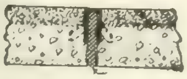

Cross-Section of Pavement Showing Expansion Joint.

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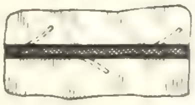

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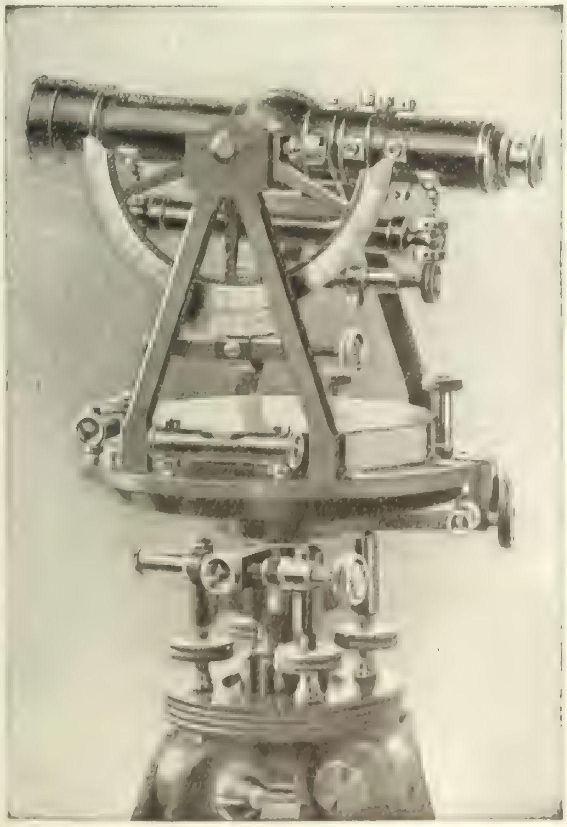

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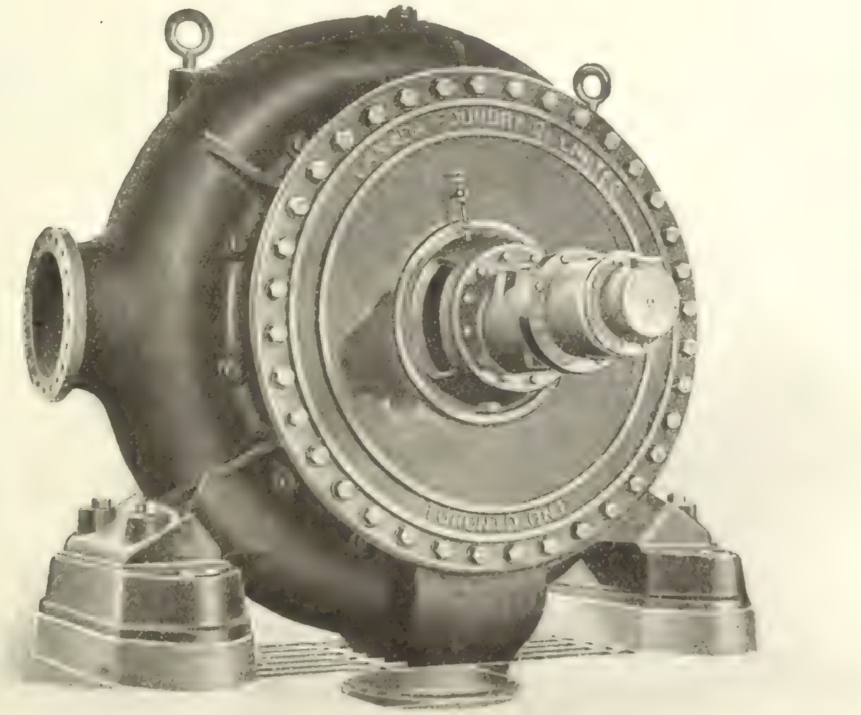

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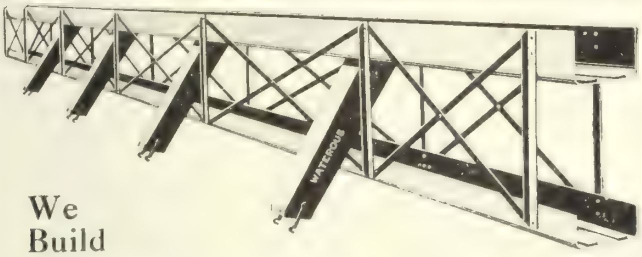

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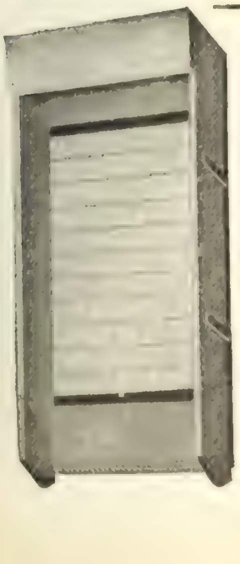

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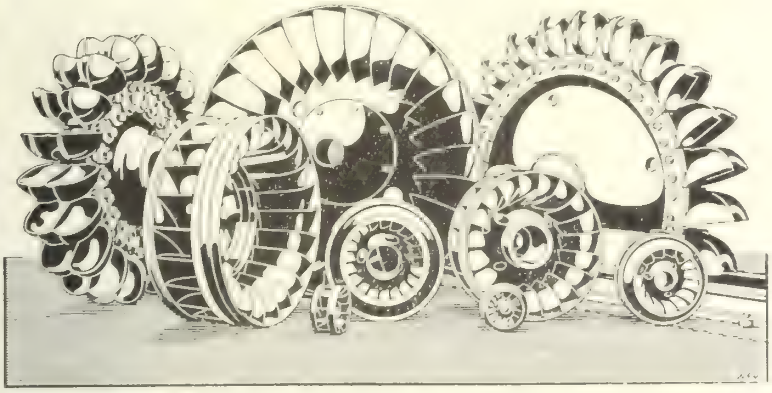

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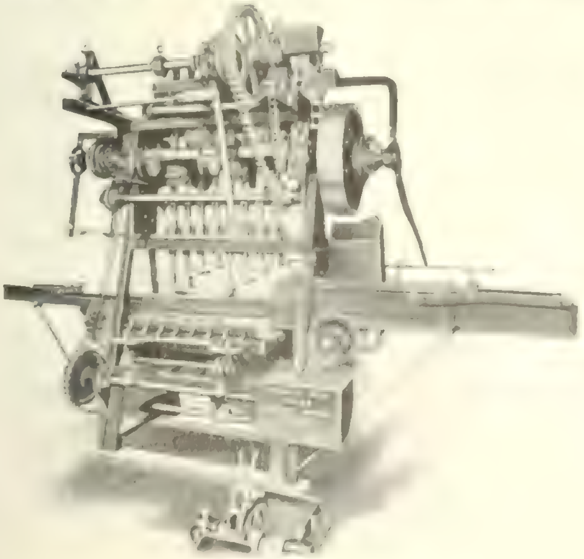

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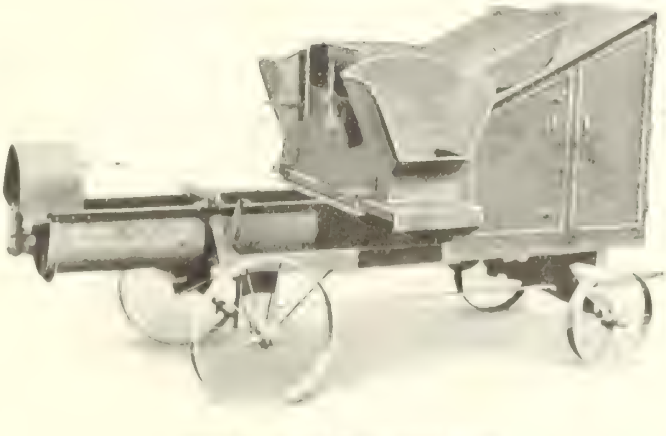

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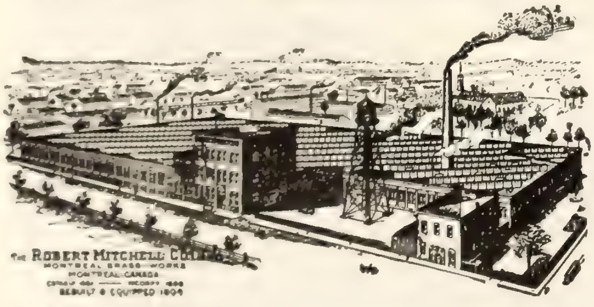

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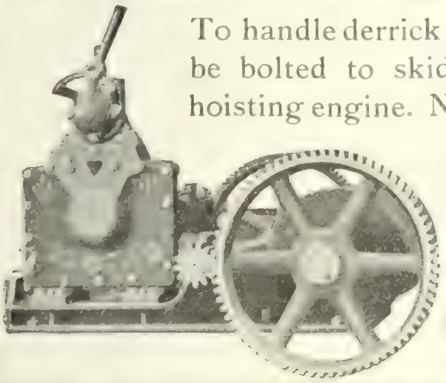

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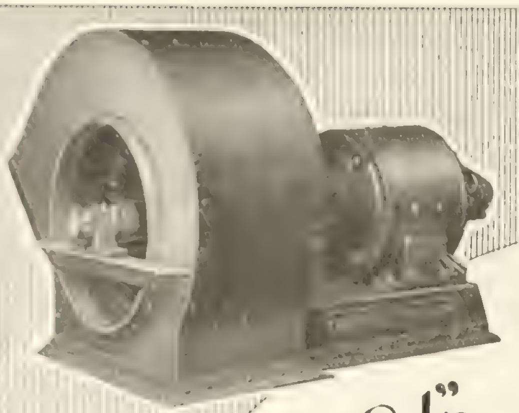

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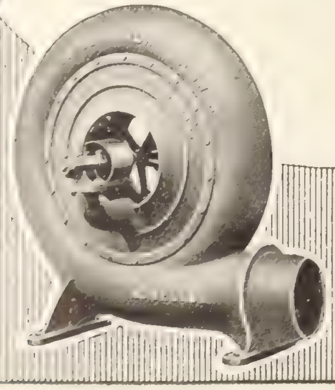

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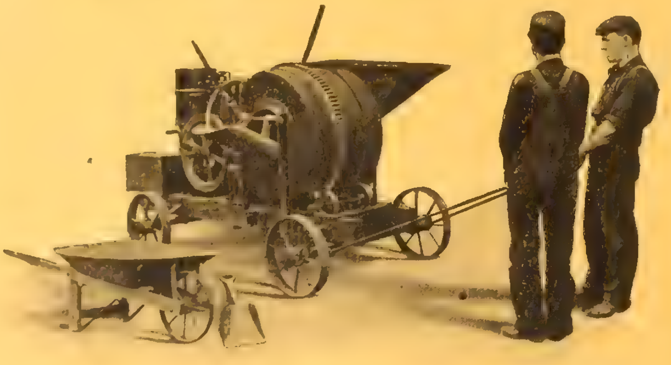

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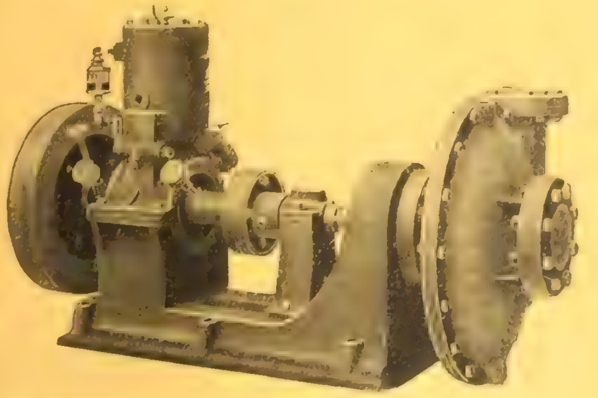

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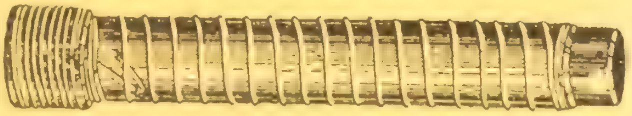

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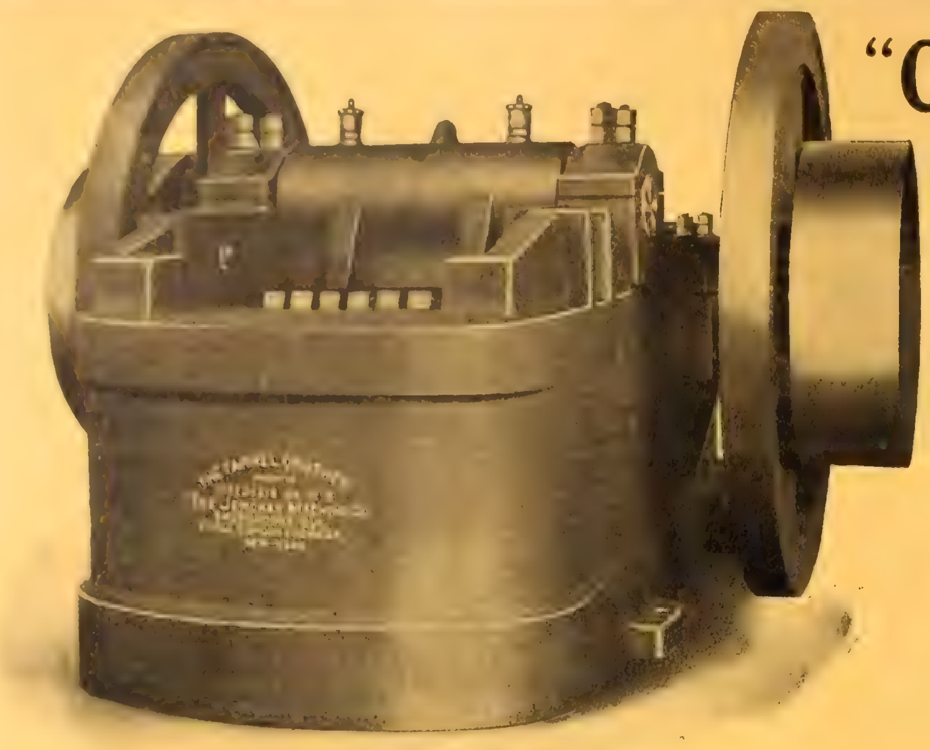

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Gartshore-Thomson Pipe Co.
Kerr Engine Co.

(Continued on page 12)

Don Valley Products

New Residence for Lieutenant Governor of Ontario, Toronto. Provincial Architect Heakes, Architect.
Don Valley Brick and Porous Terra Cotta used throughout.

Don Valley Bricks

are used in the construction of the most important public buildings erected by the Provincial Government. They are specified by the leading architects for every building of importance. The latest example of the public recognition of their superiority is found in their use for the new Toronto Residence of the Lieutenant Governor of Ontario. Don Valley Bricks possess a beauty of color and an even texture and form which add that touch of distinction to a building that characterises it as fulfilling the essentials of decorative dignity.

Don Valley Hollow Tile Fireproofing is absolutely dependable for that structural strength necessary to resist the action of age or any other deteriorating influence. For many years its success as a staple and fireproof building material has been established in hundreds of practical tests in buildings throughout the country.

"SPECIFY DON VALLEY PRODUCTS"

THE DON VALLEY BRICK WORKS

Head Office: 36 Toronto St., TORONTO
Montreal Agent: **David McGill, 83 Bleury Street**

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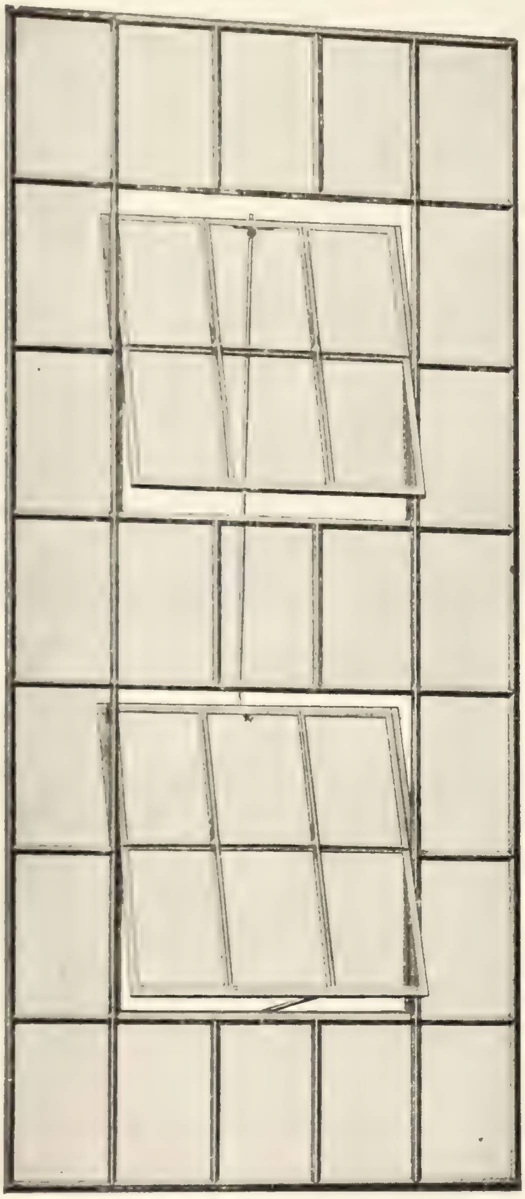


"Fenestra"

"Fenestra" TRADE MARK

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,
Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons
Railroad Shops, Warehouses, Barracks, etc.

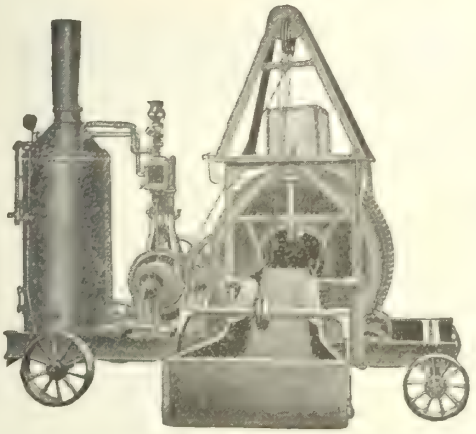
We will help you to settle the problem of your window requirements—write us.

STEEL and RADIATION, Limited

TORONTO, CANADA

London Concrete Mixers

are built in Many Styles and Sizes



London Standard Drum Batch Mixer

The MANY NEW and IMPROVED features of the LONDON MIXERS appeal to the contractor.

London Automatic Batch Mixer No. 2

The Enormous Sale of those machines is sufficient proof as to satisfaction they are giving. Everything made in our own shops.

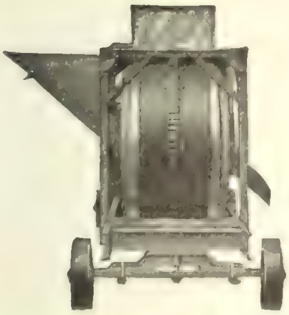
Every machine HIGH GRADE.

Every machine sold under a STRONG GUARANTEE.

London Sill Step and Window Cap Mould

SEND FOR OUR 1912 CATALOGUE which shows our complete line. 160 pages of illustrated matter. It's a dandy.

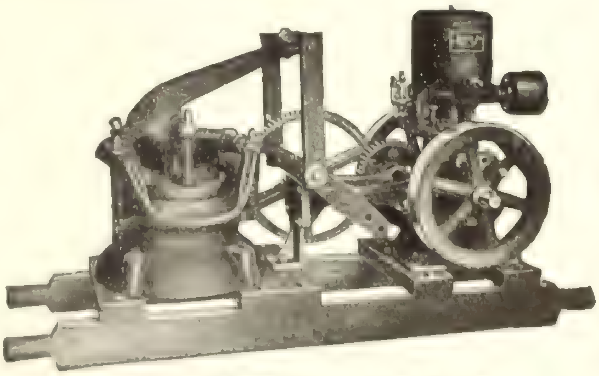
We manufacture a complete line of Concrete Machinery, Cement Working Tools, Hoisting Engines and Contractors' Tools.



London Standard Drum Batch Mixer

WE ARE THE LARGEST MANUFACTURERS OF CONCRETE MACHINERY IN CANADA. That is why we can sell at such remarkably low prices.

Producing in large quantities reduces the cost of production.



Power Diaphram Pump Operated with Gas Engine

London Concrete Machinery Co. Limited

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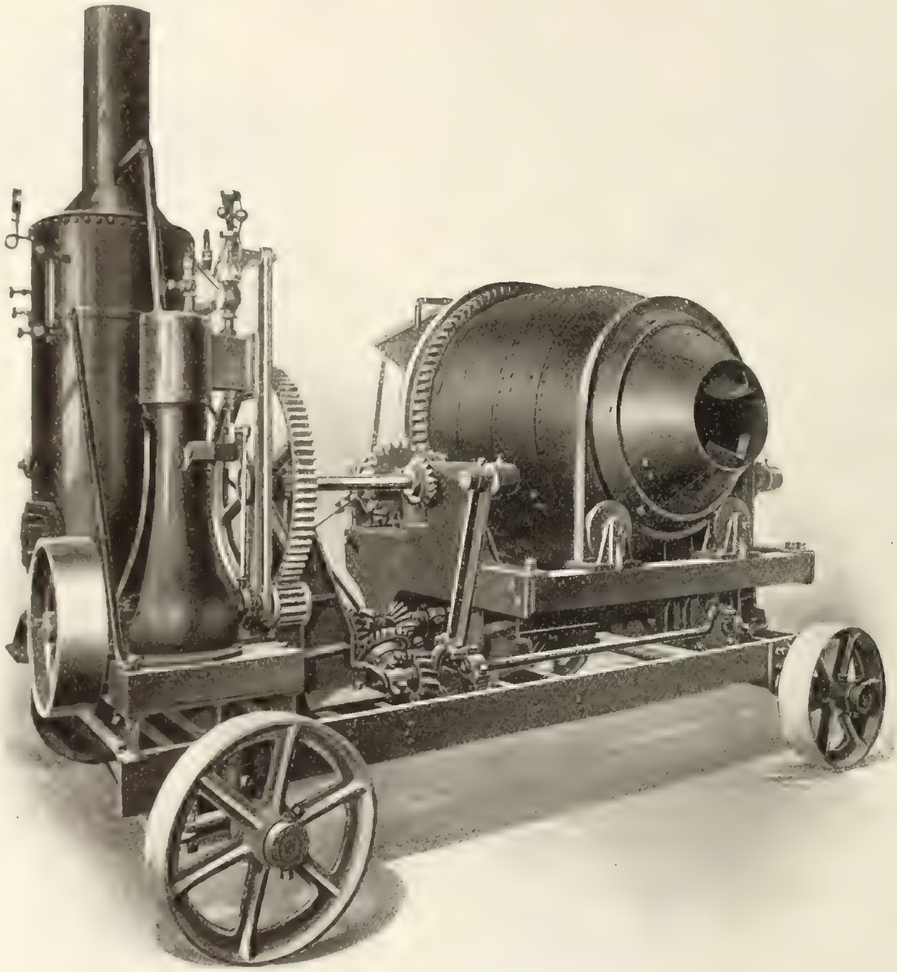
The WETTLAUFER

FAMOUS HEARTSHAPE MIXER

Automatic Operation Throughout



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BEST RESULTS

Will save you Time, Money and Labor = Dollars and Dollars to you.

Send for Catalogue and full particulars and come and see it working any time at

WETTLAUFER BROTHERS

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Portland Cement

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The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

We can supply you with the highest grade cement on the market—our

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are a guarantee of uniform good quality and our

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enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at

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For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

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"Steelcrete"

The perfect system of concrete reinforcement.

Full particulars on request orders filled from stock.

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CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

[illegible] Machinery
[illegible] British Refrigeration Co.

[illegible]
Toronto Furnace Co.

[illegible] Compounds
[illegible] Mineral Rubber Co.
Standard Underground Cable Co.
[illegible] Canada Limited

Interior Finish and Doors
[illegible] Limited
Canada Office & School Fur. Co.
Oshawa Int. Fittings Co.
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[illegible]
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F.

Lime
Christie, Henderson & Co.
Jamieson Lime Co.
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Lime Kilns
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Locomotives
Canadian Boving Co.
Montreal Locomotive Works
Canada Foundry Co.

Marble
Dominion Marble Co.
Lautz Company
Mississquoi Marble Co.

Metal Lath
Greening Wire Co., B.
Metallic Roofing Co.
Noble, C. W.
Steel & Radiation Ltd.

Metal Forms
Hotchkiss Lock Metal Form Co.

Meters, Electrical
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Hopkins & Co., F. H.
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American Spiral Pipe Works
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Gartshore-Thomson Pipe Co.
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Pile Driving Machinery
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Pumps and Pumping Machinery
Bates & Edmonds
Beatty & Sons, M.
Canada Foundry Co.
Canadian Boving Co.
Canadian Buffalo Forge Co.
Canadian Fairbanks-Morse Co.
Canadian Ingersoll-Rand Co.
Cook, A. D.
Escher Wyss & Co.
General Supply Co.
Hamilton Mfg. Co., Wm.
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McDougall Caledonian Iron Wks.
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Canada Steel Co., Ltd.
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Factory Products
Greening Wire Co., B.
Leach Contracting Co.
Steel Co. of Canada
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Paterson Mfg. Co.

(Continued on page 14)

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Glass Case—Top Connections

Ferranti

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Steel Case—Top or Bottom Connections

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The Real Belt Test is Actual Service

You do not care what tests a belt will stand unless it stands up under one—actual service.

The Sawyer Canvas Belt stands the hardest service in Brick and Clay Plants

This is one of the many classes of work to which Sawyer is particularly adapted. Whether you want a main drive, or smaller drive, or a large elevator belt, the Sawyer will do the work.
Write for our book "Stunts," which shows how others utilize Sawyer Canvas Belts.

Sawyer Belting Co., Cleveland, O.

In Building Canals

Excavating Ditches, Reservoirs, Loading Wagons, Building Levees, Embankments, etc., there's an unequaled saving in using the sturdy

Western Elevating Grader

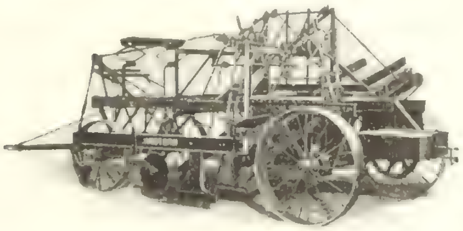
Will move 1000 cubic yards per day. Free from complicated parts. Built strong. No annoying breakdowns. Has made records as to strength and durability. There are many "reasons why" you need the Western Elevating Grader. Our Catalog will tell you.

Write today.

Western Wheeled Scraper Co.

Aurora, Illinois

Earth and Stone Handling Machinery



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS

1903	$ 0.00	1908	$ 93.26
1904	3.30	1909	200.46
1905	9.35	1910	14.07
1906	37.33	1911	2.29
1907	16.11		

Total $376.17 or 5⅔c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.

Hagersville, Ont. **Limited**

CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

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  [illegible] & Rubber Co

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  Sand and Supplies Ltd
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  Canada Iron Corporation
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  Standard Drain Pipe Co.

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  Austin Drainage Excavator Co.
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  Mun. Engineering & Contracting Company

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  Thew Automatic Shovel Co.
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  Hamilton Mfg. Co., Wm.

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  Pinchin, Johnson & Co.

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Steam Turbines
  McDougall Caledonian Iron Wks.

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  Canada Steel Co., Ltd.
  Dominion Steel Castings Co.
  Lecky & Collis
  Provincial Steel Co.

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  Canada Steel Co., Ltd.
  Factory Products
  Steel Co. of Canada.
  Steel & Radiation, Ltd.

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  Britnell & Co.
  Brodie, Jas.
  Christie, Henderson & Co.
  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
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Stone Saws
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  McNeil & Co., W. P.
  Phoenix Bridge & Iron Works
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  Sarnia Bridge Company
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  Structural Steel Co.
  Standard Steel Construction Co

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  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.
  Inglis, John
  Jenckes Machine Co.
  Marsh & Henthorn
  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Turner & Sons, J. J.
  Woods Limited
  Waterous Engine Works Co.

Testing and Inspecting Bureau
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  Gartshore-Thomson Pipe Co.
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  Sturtevant Co. of Can. Ltd., B. F.

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  Can. H. M. Johns-Manville Co.
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  Escher Wyss & Co.
  Hamilton Mfg. Co., Wm.
  McDougall Caledonian Iron Wks.

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  Canada Wire & Cable Co.
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  Standard Underground Cable Co. of Canada, Limited

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  Greening Wire Co., B.

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"PIONEER" Highest Quality ASPHALTS TRADE MARK

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For Asphalt Macadam Roads, Asphaltic Concrete, Sheet Asphalt Paving—and Filler for Brick and Block Pavements

and results will be highly satisfactory. "PIONEER" ASPHALTS are 99.5 per cent. pure bitumen. They are waterproof and weatherproof. Can be used for all purposes where an asphalt can be used.

Write for Specifications

THE CANADIAN MINERAL RUBBER CO., Ltd.
Canadian Express Building, MONTREAL
503 Canada Building, WINNIPEG

Barrett Specification Roofs

The Most Popular Roof in the World

The illustration above shows the familiar gravel surface of a Barrett Specification Roof.

Roofs of this type are used with the fullest satisfaction on thousands of great factories and commercial establishments all over the United States and Canada.

The Barrett Specification is the standard method for constructing these roofs.

It specifies the kind of felt and pitch that should be used, the quantity required, and it further defines the correct method of applying same. It also specifies a simple and practical method of inspection and provides for the identifying of the pitch and felt.

If this specification is carefully followed, the owner of the building is assured of a roof that will usually last twenty years or more without any maintenance expense whatever.

We shall be pleased to mail architects, engineers or owners of buildings, copies of The Barrett Specification with diagrams from which blue prints can be made. Address nearest office.

Special Note

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If any abbreviated form is desired, however, the following is suggested:

ROOFING: Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified, and subject to the inspection requirement.

THE PATERSON MFG. CO., Limited

Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

ALPHABETICAL LIST OF ADVERTISERS

[illegible] .. 85
[illegible] .. 93
[illegible]
[illegible]
Albion Motor Truck Company .. 34
[illegible] Works .. 89
[illegible] Company
[illegible] .. 84
American Enameled Brick & Tile Co. .. 92
[illegible] .. 2
[illegible] Works .. 23
[illegible] .. 82
[illegible] .. 24
[illegible] .. 81
Armstrong, James C. .. 104
[illegible] .. 107
Asphalt & Supply Company .. 101
[illegible] .. 92

[illegible]
Batts Limited ..
[illegible]
[illegible] .. 32
[illegible] .. 105
Bennett, Robert ..
[illegible] .. 107
Bowman & Connor .. 104
Britnell & Company, Limited .. 98
[illegible] Company ..
[illegible] .. 103
[illegible] Machinery Company ..
Brown Machine Company .. 98
[illegible] .. 97
[illegible] Company .. 93

Cabot, Incorporated, Samuel .. 21
[illegible] .. 104
Canada Cement Company .. 3
Canada Foundry Company, Limited .. 95
Canada Iron Corporation Limited .. 103
Canada Lifting Jack Company ..
Canada Steel Company .. 27
Canada Wire & Cable Company .. 27
Canada Wire & Iron Goods Co. .. 97
Canadian Boving Company .. 28
Canadian Bridge Company .. 100
Canadian Buffalo Forge Company .. 110
Canadian Fairbanks-Morse Co., Ltd. .. 111
Canadian H. W. Johns-Manville Co. ..
Canadian Kellogg Company .. 35
Canadian Mineral Rubber Company .. 14
Canadian Office School Furniture Co. ..
Canadian Pipe Company, Limited .. 24
Canadian Ingersoll-Rand Company .. 22
Carter-Halls-Aldinger Company .. 90
Ceresit Waterproofing Company ..
Chain Belt Company .. 82
Chipman & Power .. 104
Christie Henderson & Company .. 92
Clapham & Sons, John .. 81
Commercial, The ..
Conduits Company Limited .. 103
Consolidated Stone Company .. 94
Consolidated Plate Glass Company ..
Contractors' Supply Co., Ltd. .. 98
Cook, A. D. .. 82
Corinthian Stone Company .. 25
Crown Gypsum Company .. 19
Crushed Stone Limited .. 83

Dake Engine Company .. 103
Dennis Wire & Iron Works Company .. 79
DesMoines Bridge & Iron Company .. 101
Dickson Bridge Works ..
Dominion Bridge Company .. 100
Dominion Concrete Company .. 78
Dominion Creosoting Company .. 80
Dominion Ornamental Iron Company .. 99
Dominion Marble Company .. 21
Dominion Sewer Pipe Company .. 20
Dominion Steel Castings Company .. 26
Dominion Wood Pipe Company .. 97
Don Valley Brick Works .. 7
Doty Marine Engine & Boiler Co. .. 76
[illegible] .. 77
Douglas-Milligan Company ..

Elaterite Paint Company ..
Engineering Works of Canada ..
Erie Machine Shops .. 81
Escher Wyss ..

Farmer, John T. .. 104
Ferguson, H. S. .. 104
Ferranti Electrical Co. .. 12
Foundation Company ..
Fraser, E. M. .. 104
Fuce & Smith .. 104

Galt Engineering Company, John .. 104
Galt Stove & Furnace Company .. 78
Gardner & Saxby .. 104
Gartshore, John J. .. 104
Gartshore-Thompson Pipe & Foundry Co. .. 102
Gaudry & Company, L. H. .. 109
General Supply Company .. 28
Goodyear Tire & Rubber Co. of Canada, Ltd. 33
Greening Wire Company, Limited, B. .. 84
Gurley, W. & L. .. 93

Hagersville Contracting Company .. 13
Hancock, Jr., H. Syd. .. 104
Hamilton Art Glass Co., Ltd. .. 81
Hamilton Bridge Co. ..
Hamilton Mfg. Company, Wm. .. 21
Hamilton Pressed Brick Company ..
Harvey, J. .. 85
Heinicke Company, H. R. .. 20
Hepburn John T. .. 31
Hobbs Manufacturing Company ..
Hopkins & Company, F. H. .. 112
Hotchkiss Lock Metal Form Company .. 83
Hunt & Company Robert W. .. 104
Hynes, W. J. ..

Improved Equipment Company ..
Imperial Wire & Cable Company .. 111
Inglis Company, John .. 19
International Marine Signal Co. .. 18-92

Jamieson Lime Company ..
Jenckes Machine Company .. 2
Jennings & Ross ..
Johnson, A. H. .. 94

Kennedy, James C. .. 104
Kerr Engine Company, Limited .. 108
Koehring Machine Company .. 106

Laurentian Granite Company .. 85
Laurie & Lamb .. 1
Lautz Company ..
Lea, R. S. .. 104
Lecky & Collis .. 17
Leonard & Sons, E. .. 83
Linde British Refrigeration Company ..
London Concrete Machinery Company .. 9
Lundy Shovel & Tool Company .. 86
Luxfer Prism Company .. 88

MacLean Daily Reports .. 106
Mahan & Company ..
Marsh & Henthorn, Limited .. 78
McDougall Caledonian Iron Works Co., John 75
McDowal, R. .. 104
McKinnon Holmes & Company ..
McMillan & Sons, W. ..
McNeil & Company, William P. .. 102
Meadows, George B. .. 35
Metal Shingle & Siding Company .. 86
Metallic Roofing Company .. 79
Metropolitan Paving Brick Co. .. 23
Miller & Company, Geo. M. .. 93
Missisquoi Marble Co., Ltd. .. 92
Mitchell Company, Limited, Robert .. 100
Montreal Locomotive Works Limited .. 83
Morrison & Company .. 104
Munderloh & Company, Limited .. 105
Mussens Limited .. 4
Myers, Oakley .. 83

Napanee Iron Works .. 17
National Bridge Company of Canada .. 101
National Iron Works Limited .. 103
National Pipe & Foundry Company .. 102
Neptune Meter Company .. 18
Noble, Clarence W. .. 79
Northwestern Terra Cotta Company .. 97

Ontario Asphalt Block Co., Ltd. .. 89
Ontario Sewer Pipe Company .. 20
Ontario Wind Engine & Pump Co. .. 83
Ormsby Limited, A. B. .. 35
Oshawa Interior Fittings Company .. 82
Owen Sound Iron Works .. 96

Pacific Coast Pipe Company .. 1
Paterson Manufacturing Company .. 15
Pedlar People .. 29
Phoenix Bridge Company .. 97
Piggott & Company, Thomas .. 94
Pinchin Johnson & Company .. 110
Power & Son .. 93
Provincial Steel Company .. 26

Queenstown Quarry Company .. 103

Reid & Brown .. 104
Rhodes Curry Company, Limited .. 107
Rogers, Limited, Alfred .. 11
Roman Stone Company .. 30
Royce Limited .. 32

Sackville Freestone Company, Limited .. 32
Sand & Supplies Limited .. 102
Sarnia Bridge Company, Limited .. 101
Sawyer Belting Company .. 13
Sheldons Limited .. 18
Sheppard, James ..
Silcox, A. B. .. 81
Slack & Company, T. .. 85
Smart-Turner Machine Company .. 1
Smith Limited, Thos. & Wm. ..
Smyth & Ryan .. 97
Standard Ideal Company .. 36
Standard Steel Construction Co. .. 101
Standard Underground Cable Co. of Canada
Stanley Company, W. F. ..
Star Expansion Bolt Company .. 21
Steel Company of Canada .. 26
Steel & Radiation .. 8
Stinson-Reeb Builders' Supply Co. .. 36
Structural Steel Company .. 100
Sturtevant Co. of Canada, Ltd. B. F. .. 27

Taylor, J. & J. .. 87-81
Thew-Automatic Shovel Company .. 78
Toledo Wheelbarrow Company .. 94
Toronto Plate Glass Importing Co. .. 1-97
Toronto Iron Works .. 89
Trussed Concrete Steel Company .. 98
Tuec Company .. 109
Turner, C. A. P. .. 88

United States Steel Products Co. .. 29
United Typewriter ..
Urschel-Bates Valve Bag Company ..

Waterous Engine Works Company .. 96
Weeks, Arthur L. .. 104
Welch & Company, H. J. .. 104
Western Canada Contractor .. 98
Western Wheeled Scraper Company .. 13
Wettlaufer Bros. .. 10
Winnipeg Industrial Bureau .. 91
Woodstock Wind Motor Company .. 99
Woods Limited .. 89
Wood and Service .. 104
Wooliscroft & Son, G. ..

York Sand & Gravel Company .. 98

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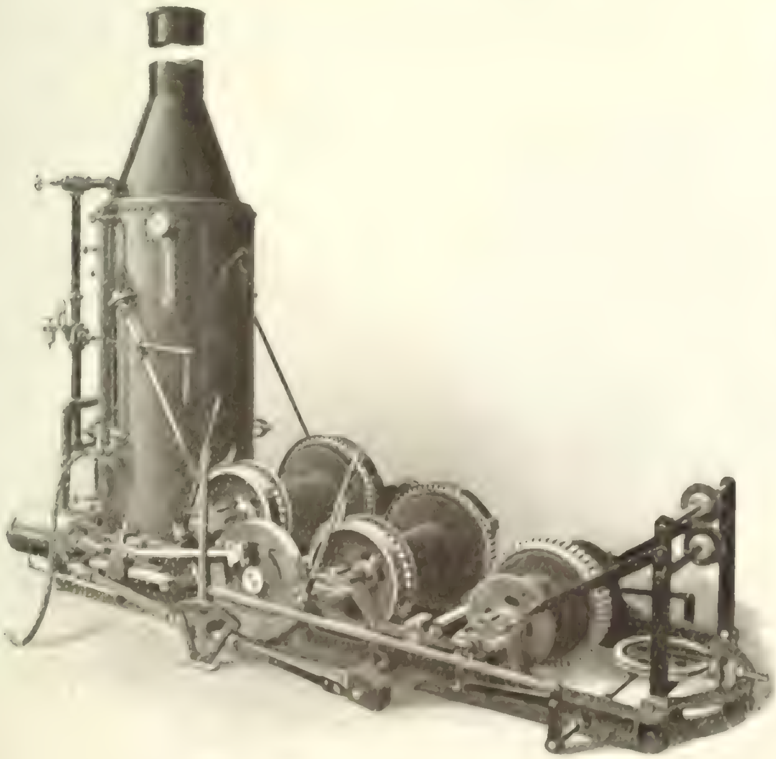

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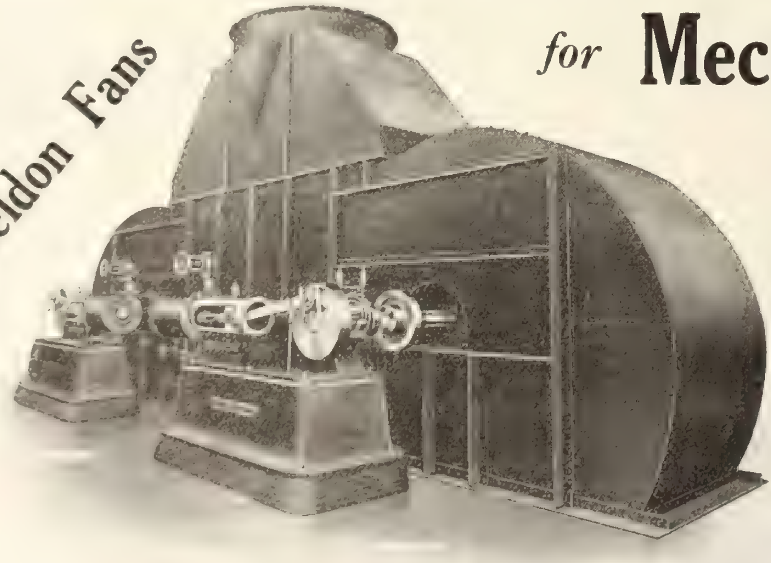

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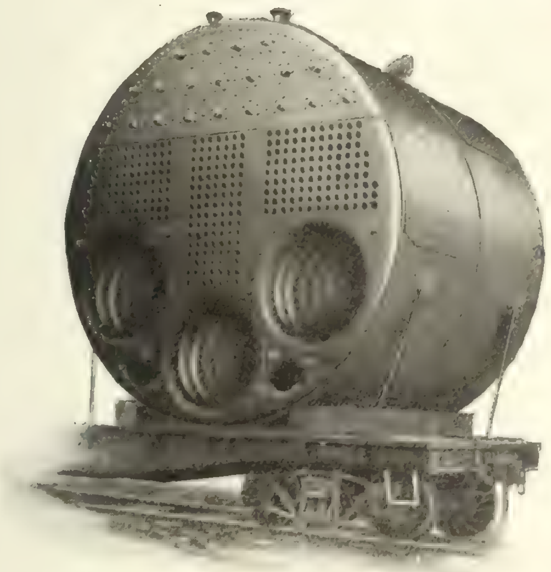

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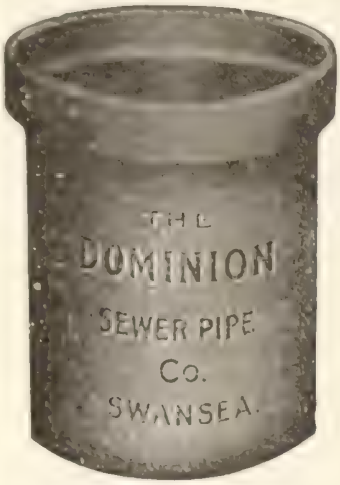

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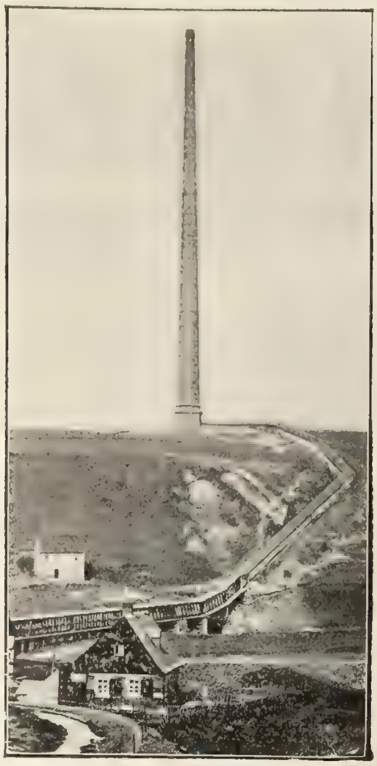

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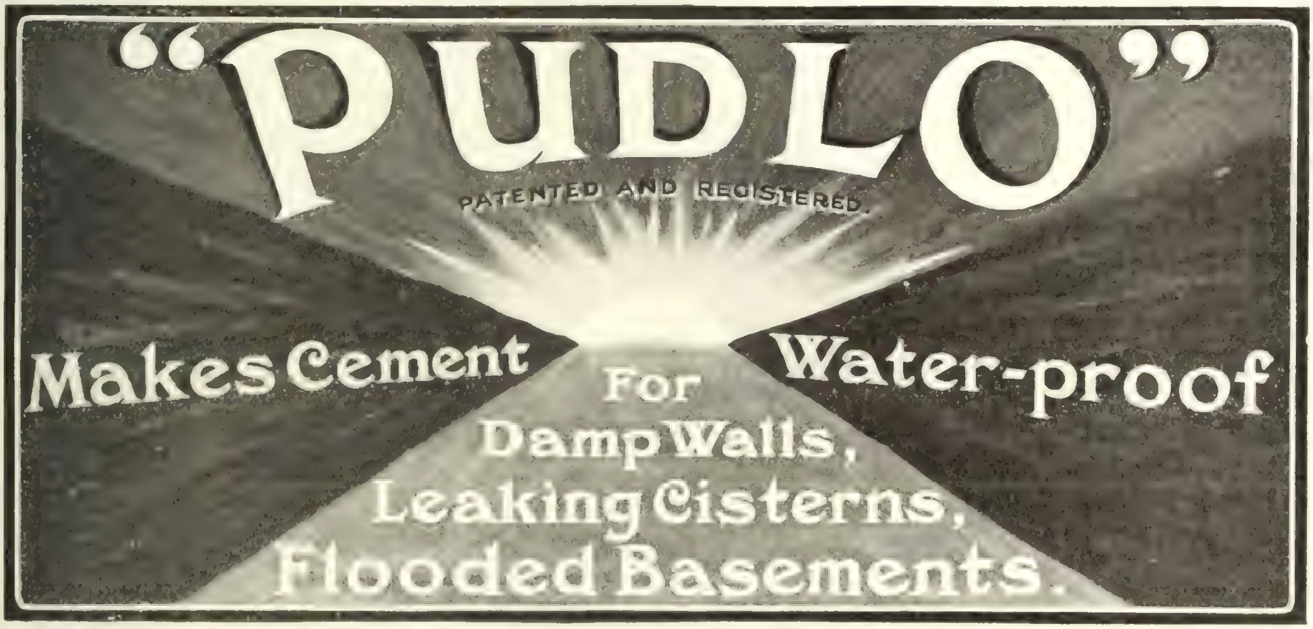

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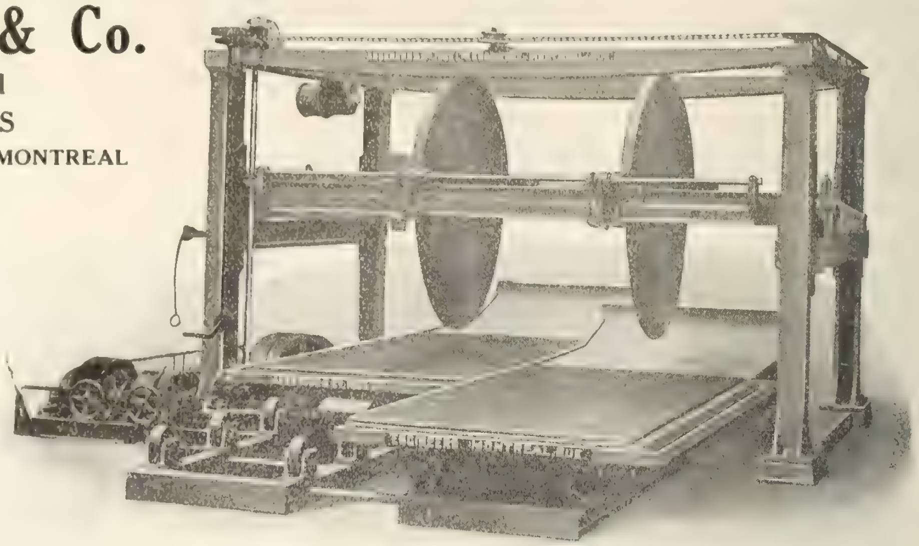

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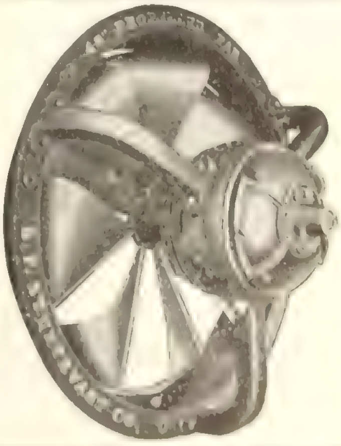

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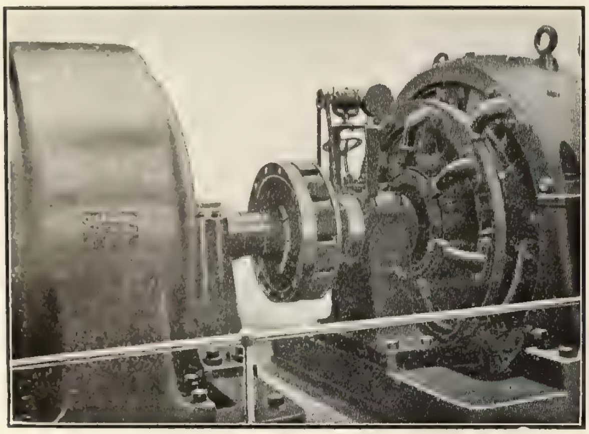

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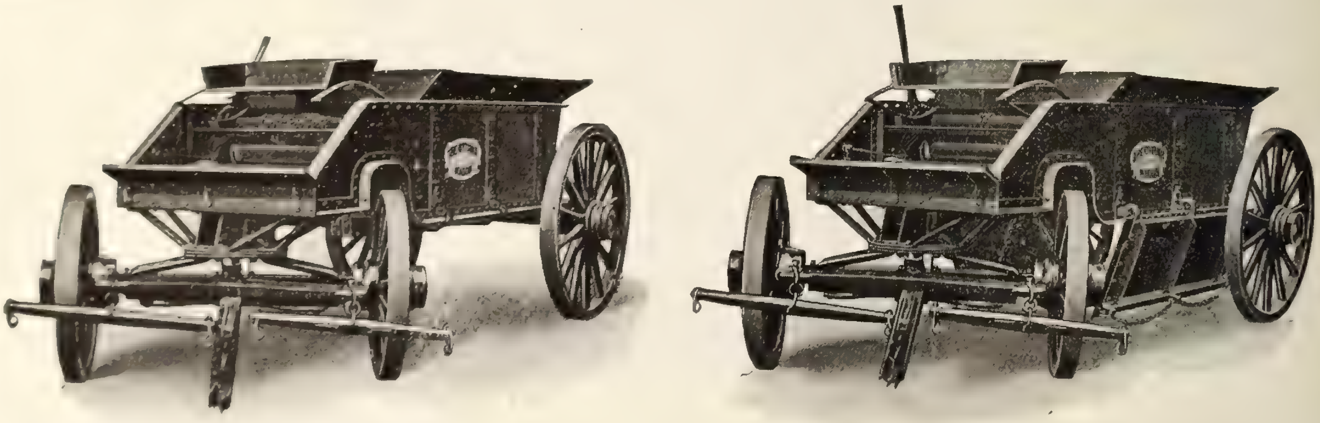

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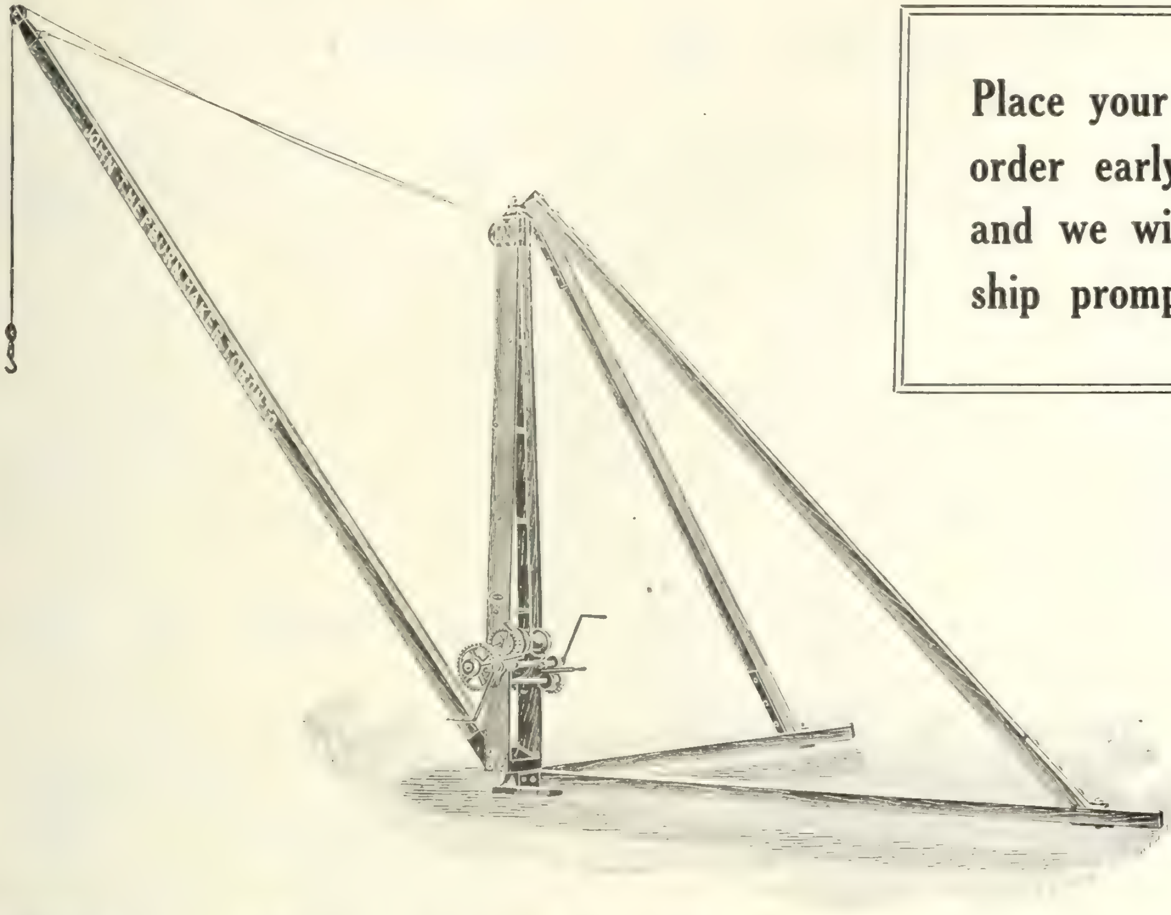
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This accounts for our receiving the larger portion of orders for engines used on this class of work.

We are equally well able to furnish YOU a Hoist fitted for YOUR individual needs.

May we send you new descriptive matter covering our Engines and Buckets, etc. We'll be glad of the chance.

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A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

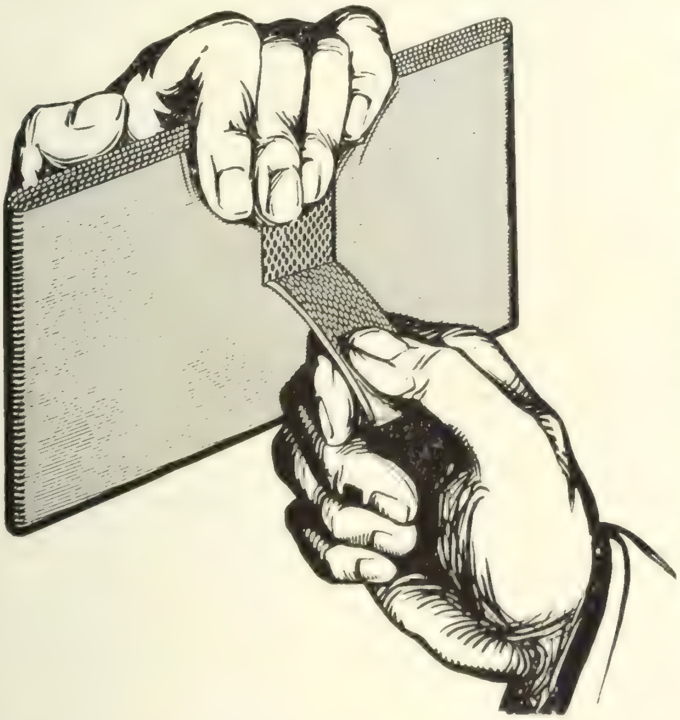
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard-twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

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Factory, Bowmanville, Canada

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Largest Manufacturers of Motor Trucks in the British Empire,

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Unfortunately many in this country cannot visit their works where they would see one of the ***largest and most up-to-date motor car mauufacturing plants in the world*** equipped with modern tools and located at Glasgow, the largest engineering centre in Great Britain, with abundance of skilled labor and low cost of living, but you can see from demonstration cars and at the Montreal and Toronto shows the ample size of all wearing parts, the large size of the tires supplied, the solid steel wheels, the feeding of minute quantities of oil to every bearing under some 50 lbs. pressure, the many patents which protect the cars from abuse by poor drivers, and you will understand the reliability and long life of the trucks.

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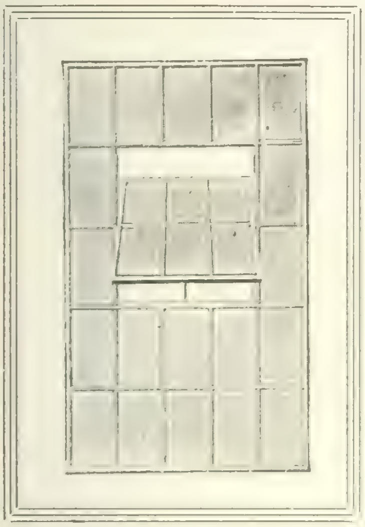

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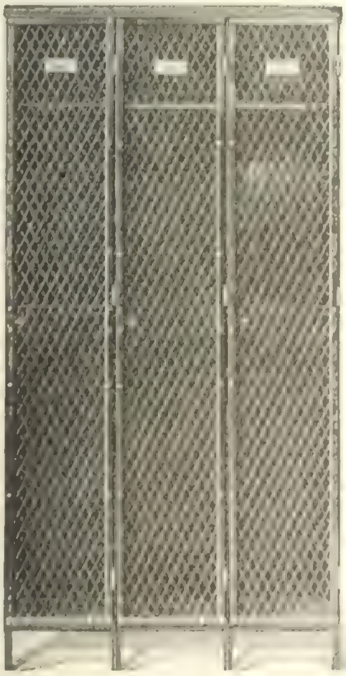

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ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY
HUGH C. MacLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
VANCOUVER - Tel. Seymour 2013 - Hutchison Block
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BOSTON - - - Main 1024 - - - 643 Old South Building
LONDON, ENG. - - - 3 Regent Street, S.W.

SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 27 January 29, 1913 No. 5

Contract Procedure at Calgary

RECENT remarkable procedure in the award of contracts at Calgary was the subject of an editorial article published in our issue of December 25th, 1912. The facts concerning the school awards as set forth in that article were furnished by a reader of this journal and have not been refuted, but in the closing paragraph we alluded to an alleged attempt "to saddle the city with an $800,000 bridge without competitive bids." As this version was only that of the local press we refrained from comment and suggested the possibility of our referring to that matter at a later date. The opportunity now presents itself.

From the manner in which this subject was discussed by the Calgary papers at the time, it is evident that some influence was brought to bear upon members of the city council. According to facts which reach this journal from an authoritative source, the whole record is one of bungling and mismanagement. It appears that the city formally advertised for tenders for bridge construction. In response to the advertisement, a number of tenders were presented which entailed a considerable expenditure of time and money in their preparation. Tenders were asked for in advance of submitting the by-law, this being with the object of ascertaining whether the cost of the work would be prohibitive. The bidders, taking a broad view of the matter, accepted this excuse for a somewhat unusual procedure and, acting in good faith, submitted their proposals. The by-law was then submitted to the ratepayers and carried by a vote of about three to one. Immediately thereafter, publicity was given to a statement that the work could be carried out for $200,000 less than the "successful" figure. This statement was made without any plans or careful figuring, but considerable doubt was raised—where none should properly have existed—and with an election following soon afterwards and many changes in the city council in prospect, sufficient feeling was stirred up to prevent the award of the contract by the retiring council. And so the time and money spent in the preparation of bids for work involving the greater part of $1,000,000 were wasted.

The point of this article is not one affecting an individual as much as a community. In its wider application we may say that it affects the whole community, for it touches upon the interests of the poor misguided ratepayer. As things stand at present, the city of Calgary cannot hope to let its bridge contracts to good advantage. Here is a proposed construction involving a large expenditure of money on the part of the city, and a great deal of time on the part of bona fide bidders in the preparation of estimates and designs, and the authorities, after having obtained proposals, conclude that they will be well advised to get more competition and re-let the work—with the figures previously submitted a matter of public knowledge! Is it not reasonable to suppose that responsible contractors will now be inclined to pass up the invitation and refrain from making a bid? Or would it be an illogical conclusion that certain interests would be so favored that it would be politic from the business standpoint either to stay out of the game or to enter into a combination with those more favored by the ones immediately in power?

The conditions obtaining at Calgary will not appeal to straightforward bidders. This is the particular relation of the incident to local work. But in its general application the case points the moral that the modus operandi is one to steer clear of, and that the contractor's interests in civic negotiations should be properly and legally established before he risks his time and money under a provision which amounts to "Heads I win; tails you lose."

Sequel to Westmount "Scandal"

IN our issue of October 23rd last, under the heading, "Westmount Contributes a 'Scandal,'" we made editorial reference to attempts to discredit Mr. Archibald Currie, City Engineer of Westmount, P.Q., by two or three aldermen, who were disinclined to share responsibility for certain work the cost of which exceeded the original estimates. It was sought by one alderman in particular, Mr. McBride, to show that the engineer was in the habit of giving unreliable estimates, and in order to prove his case the alderman very carefully concealed estimates which, if included in the total, would have knocked the bottom out of his argument. An election was not far off, and as officials are very convenient persons on whom to lay blame, Mr. Currie came in for a good deal of abuse. The City Engineer does not claim to be infallible; he makes mistakes, like every other person, but, naturally, he declines to shoulder the errors of others. During the election Alderman McBride strongly attacked the road department, and made statements which, if true, were not creditable to the officials. But this attack was in the nature of a boomerang, for, it brought the following letter, written at the suggestion of the chairman of the road committee and approved by him:

D. H. McLennan, Esq., Chairman Road Committee.

Dear Mr. McLennan: With [illegible] to the [illegible] [illegible] Westmount [illegible] now Mr. McBride, as usual, makes some extraordinary statements evidently to suit his own purposes, and to discredit me in the eyes of the public as much as he possibly can. He has in the last twelve months taken every opportunity to put wrong meanings and mis-statements on everything connected with my work, yet he proclaims from the housetops of St. James street, in the press, and in the council that he is one of my best friends. I leave every right-thinking and intelligent individual to draw his own conclusions.

Mr. McBride has on more than one occasion thrown out veiled innuendos as to the probity and integrity of those carrying out public work in Westmount, but he has never yet gone as far as he did last night. With his peculiar aptitude for drawing hasty conclusions, he states that men were paid for time they did not work. I now challenge him to prove it, either from official records or elsewhere. In the first place, no laborers are paid at rates ranging from .35 to 50 cents per hour. Further, I can prove from records that the 117½ hours per week as alleged by Mr. McBride to have been worked by laborers, was worked by one carpenter in two weeks, not one week.

Mr. McBride has also, with his usual ingenuity in distorting statements, selected a wonderful list of twenty-six items showing over expenditure. These items have always been admitted, and, as explained to the council, some of them were on estimates of two or three years ago, and not compiled under my supervision. Anyone with a knowledge of public works knows that prices of labor and materials have increased considerably in the interval. Mr. McBride's figures, showing excesses, as far as they go, are admittedly correct, as the items he so graciously published were originally taken from records in my office.

We have in Mr. McBride a splendid example of the personification of righteous indignation. Will he tell the citizens of Westmount the history of the purchase of the automobile hose waggon, which is really the basis of his antagonism towards myself. After Mr. McBride made his wonderful trip to Hartford re mechanically driven fire apparatus, his literature was handed to me for report. This report I made and recommended that tenders be called for publicly and submitted a general specification. This recommendation, Mr. McBride indignantly opposed, for reasons which he alone can explain.

Will Mr. McBride tell the citizens of Westmount why he was so emphatic in urging the council to accept an automobile hose wagon which did not comply with the conditions as agreed to between the suppliers and the council

I have no hesitation in challenging Mr. McBride that the sole reason for his antipathy towards me, which has now assumed a very strong personal element, is nothing more nor less than that I had the audacity to write a report, after careful study and tests of the vehicle, recommending that the hose wagon be not accepted.

When Mr. McBride makes such frequent allusions to Messrs. Holgate, White & Wright's report it is regrettable that he does not quote it correctly, but gives his own garbled conception of it.

ARCH. CURRIE, City Engineer.

This letter was also approved by Alderman E. Herbert Brown, who, it is satisfactory to note, made a vigorous protest against the City Engineer being brought into election politics. Evidently the ratepayers approved the attitude of Mr. Brown and other aldermen who stood with him, for they rejected Mr. McBride, who can now, in his enforced leisure, ponder over the futility of unfair attacks on public officials. Probably the man who has gained most credit out of the controversy is Mr. Currie, for it has been the means of making public the following statement from Mr. Henry Holgate, the well-known consulting engineer, and a resident of Westmount, who was chairman of a committee which investigated some over-expenditure on a fire station, on which Mr. Currie admittedly made a mis-calculation:—

"I had no idea that it was supposed that the city of Westmount was making enquiries with a view to appointing another engineer, and I certainly hope this is entirely without foundation. I consider that there has been nothing disclosed which would warrant the town in dispensing with Mr. Currie, and from my personal knowledge of his work, I think that it would be a decided mistake at the present time, and, in fact, I consider that his services to the city as engineer are really worth a higher recompense than he is now receiving.

"When you get a combination of engineering ability and personal honesty, and combined with intelligence and activity, I think that you have a good combination, and it would be a pity to disturb it, and certainly not in the interests of the city."

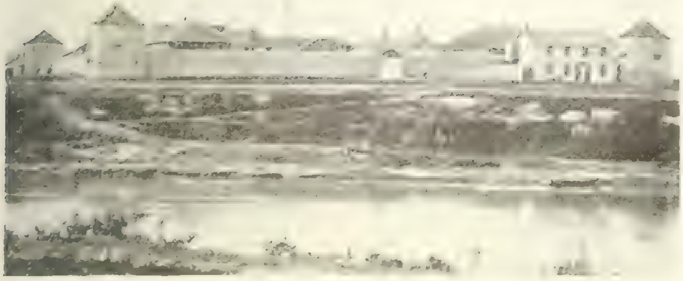
We publish the above not for the purpose of vindicating Mr. Currie, who, as his letter shows, can hit out with the best, but as a rather rare instance of a civic official getting proper consideration. Probably if city engineers, who appear to be considered as fair game by disgruntled aldermen, would stand up more to their traducers, there would be less cause for complaint as to their persecution by men seeking cheap popularity.

Damages for Delay in Contracting

ALL government engineering contracts provide that if the work is delayed by the contractor, he shall pay either actual damages, to be calculated by the engineer, or liquidated damages agreed upon in advance, said William B. King in a recent paper before The American Society of Engineering-Contractors. No valid objection can be made to either of these provided that there is some check on the engineer's figures or the liquidated damages are reasonable in amount. Every contractor with the government is bound to diligence in the execution of his contract, and it is right that he should be held to a strict responsibility for delay arising out of any causes within his control. But the same rule should be applied to the government. Where the contractor is delayed through the failure of the government to furnish plans, to deliver the site of the work, to furnish material required of it, or through the fault of other contractors employed separately by the government ought to pay the contractor's losses by the delay.

One Man Cannot Do It All

FOLLOWING out the policy of the above axiom has resulted in the successful outcome of many large manufacturing enterprises, says The Brick and Clay Record. A "one man" concern cannot be expected to extend beyond the compass of that man's limited horizon. But take that man's power, knowledge and ability, and make it a 10-power man and you have a force that can work wonders. Marshall Field, the merchant prince, according to his own words, became many times a millionaire by hiring men who knew more than he did. If he had been of the "know-it-all" type he would probably have spent his life running a country dry-goods store.



The Old Fort Garry of 1872

The Winnipeg of 1913 Wholesale Section

WINNIPEG

¶ Probably no other city on the continent has made such stable and yet such rapid development during the last few years as the capital of Manitoba. Entrance to and economic centre of the Canadian West, a tributary territory greater even than that of Chicago, Winnipeg has indeed much in common with the Illinois city and of late years has actually grown in greater proportion than that populous mid-western metropolis. Winnipeg, with its wide streets and pavements, fine commercial and public buildings, excellent transportation facilities, cheap power, and a population of 175,000 people, is fast becoming all that an up-to-date city should be. It would be hard to find another example of such successful municipal development as Winnipeg affords. Winnipeg is a city of phenomenal achievement in constructional enterprise.

Winnipeg, in 1870, was a Hudson's Bay trading post with a population of 215, but the history of the city goes back to 1812 when Lord Selkirk planted his colonists in the Red River Valley. With Confederation, and the suppression of the Riel rebellion, a new order of things was established and the west began to come into its own with Winnipeg at the gateway of trade. Once on the way, the city made rapid progress. Incorporation took place in 1874 when there were 1,869 inhabitants and the place had taken on the status of a large and thriving village. The story of fertile wheat lands began to spread abroad, and in 1878 the first steam railway pushed up from the States to a point just across the river from Winnipeg. The most important date in Winnipeg's history, however, is 1882. In that year the Canadian Pacific Railway reached the city on its way to the Pacific Coast, beginning a stream of travel and trade that has swept a million and a-half people into the prairie provinces; built up a volume of trade that taxes the capacity of five great railroads; caused hundreds of millions of money to be invested; poured forth profits in crops and business that seem fabulous, and incidentally established Winnipeg as the unrivalled supply centre of a vast domain. Thirty years ago a straggling but prosperous village, to-day a "world centre," Winnipeg has earned a reputation for continuous performance in civic progress and development.

Banking Progress.

Figures of trade and industrial growth prove that Winnipeg has assumed a size and importance far beyond that of a city that is not yet forty years old. Bank clearings from the twenty-three banks show that Winnipeg ranks third among all cities of the Dominion in the volume of banking business. Comparisons with such cities as Portland, Denver, and Buffalo, show that while the population of each of these cities is double that of Winnipeg, the weekly bank clearings of the prairie city are as great as the three combined.

The first bank started in Winnipeg in 1873 was naturally small. To-day the twenty-three banks have over seven hundred branches in the western provinces.

A recent tabulation of the bank clearings for one month, published by Bradstreets, showed that Winnipeg stands thirteenth in the list of cities on the American continent having the greatest volume of bank clearings. Only ten United States cities surpassed Winnipeg on this occasion, and the rate of increase, if maintained, showed that two of these cities before long would have to give way to the city at the gateway of the Canadian West.

Winnipeg's Building Records

During the last seven years Winnipeg has expended nearly $100,000,000 in new buildings. Last year the total was $20,475,350 as compared with $17,716,750 for 1911—an increase per cent. of 16. This record was surpassed by only one city—Toronto—in the whole of the Dominion. It is illuminating as to the character of Winnipeg's building growth that no less than seventy apartment houses were erected last year at a cost of some $3,000,000. A like sum was expended in banks and office buildings and over $2,000,000 in factories and warehouses. It is safe to say that no city on the continent can show a better balanced distribution than Winnipeg. [illegible]

Exterior and interior views of the new Bank of Montreal, Winnipeg. Architects, Messrs. McKim, Meade & White; Contractors, Messrs. Norcross Bros.

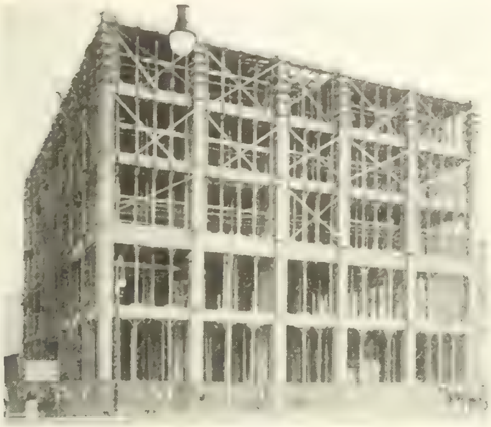
maintained from year to year in the building of wholesale houses, business blocks, churches, schools, residences and apartments. The proportionate nature of the development is shown by comparing the above classification with the statement that in 1911, $2,500,000 was expended in apartment blocks and the same amount in factory and warehouse buildings.

The building activity of the last year or two has effected a literal transformation in the Winnipeg skyline. The extent of the city's constructional development must be seen to be appreciated.

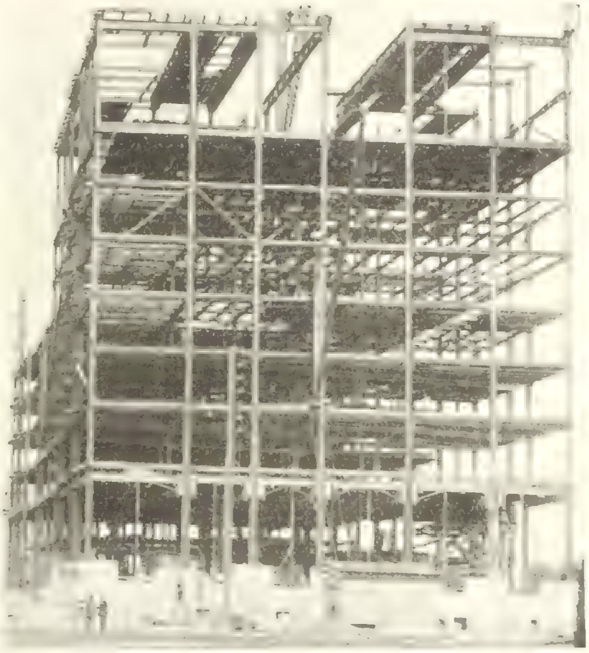
It must be remembered that the figures given above are for buildings erected within the city limits only. Until 1905 there was little building in the suburbs. Lately, however, the city has rapidly overspread its limits and there is now a considerable amount of building which might properly be accredited to Winnipeg but which does not appear in the annual returns for the city. In the suburbs of St. James, Kildonan, St. Boniface, and south along the Red river, over $3,000,000 is spent annually in building work by people who carry on their business in Winnipeg but prefer to live a little distance from the city.

A marked feature of the 1912 building operations in Winnipeg was the general improvement of the buildings erected in the business section of the city. In every direction, steel sky-scrapers may be observed in different stages of completion. Among these may be mentioned Confederation Life Building, on Main street, the new G.T.P. Fort Garry hotel, which is to cost $1,500,000, and the Union Trust building, at the corner of Main and Lombard streets. The last-named building, when completed, will be the highest structure on Main street. The new Sterling Bank building on Portage avenue was barely completed last spring when an addition was found necessary and started immediately. The palatial Bank of Montreal at the corner of Main street and Portage avenue, a detailed description of which has already appeared in these pages, is perhaps the most noteworthy building finished recently. Mention should also be made of the Bank of Commerce on Main street, which is completed except for the interior fittings. It would take too long to enumerate the dozens of warehouses, factories and business blocks that have contributed to the extension of the city of Winnipeg during the last year. A feature of the new work is the prevalence of reinforced concrete construction. Many buildings of this type have been erected in record time at Winnipeg. In every place where the business sections of the city are encroaching on the residential districts, buildings of this material are in strong evidence.

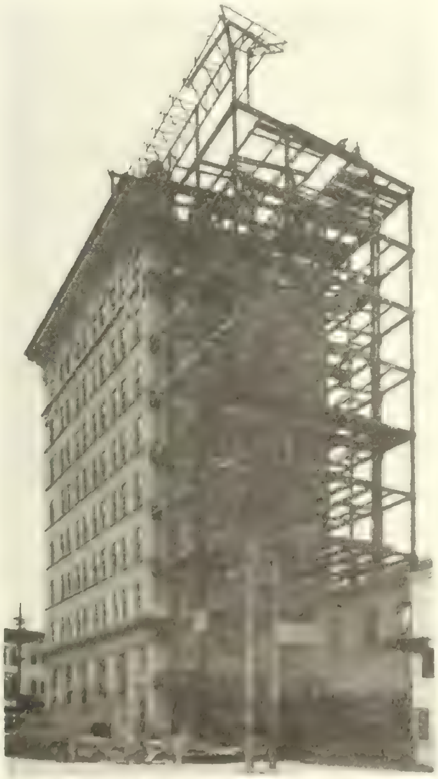
Dormitory building under construction at the new Provincial Agricultural College at St. Vital, Man.



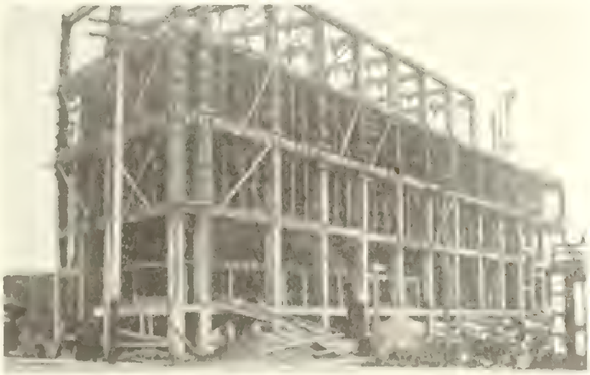
Boyd building at an early stage of its construction by the National Construction Company



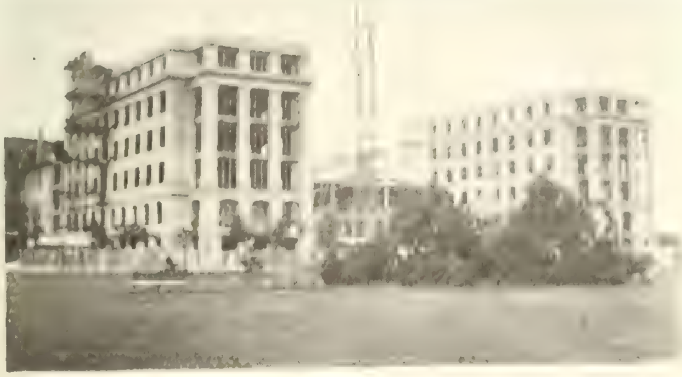
Steel frame-work of the Fort Garry hotel. Contractors, Geo. A. Fuller Company



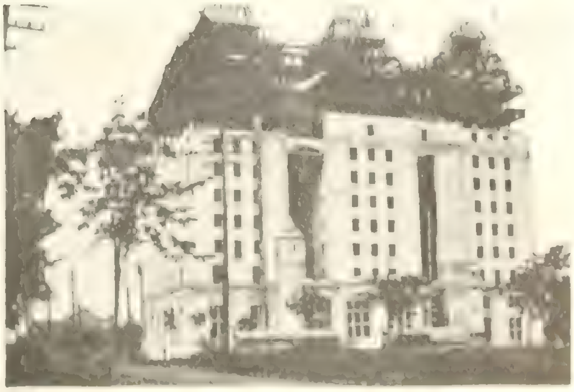
Sterling Bank, Winnipeg, under construcion



Farmers' Advocate building. Architect, Mr. H. E. Matthews; general contractors, Lyall-Mitchell Company



Extensions to the General Hospital, now well advanced



A later view of the Fort Garry hotel work

In the down-town streets many substantial structures attest to the faith of the banks and other financial concerns in the future of the city of Winnipeg.

An extensive building programme has been entered upon by the city. New administrative buildings, law courts and a new city hall are to be erected shortly and these have suggested an architectural centre for the city. The latter proposal includes the widening of Vaughan street, placing the parliament buildings at the south end of the banks of the Assiniboine, with the Law Courts, Land Titles Offices and other fine buildings along the sides of the street, which it is proposed to develop as a mall, with the vista at the north end closed by the new city hall.

The new legislative buildings for the province of Manitoba, as provided for in the plan of Mr. F. W. Simon, architect, of Liverpool, England, will occupy a commanding position on a magnificent, park-like site of nearly thirty acres on the bank of the Assiniboine River. The estimated cost is $2,000,000. Sixty-five architects, practising within the British Empire, submitted plans for competition. The adjudicator was Mr. A. L. Stokes, president of the Royal Institute of British Architects. The main entrance of the building, which is to be in the form of the letter "H," will face Broadway on the north, but on every side there will be an entrance almost equally imposing, all of which will lead to the grand rotunda in the centre of the pile of buildings. The approach will be by means of a grand flight of stairs leading to the grand staircase hall on the first floor. The central dome will be one of the most striking features of the building. This will be 240 feet high, resting on huge columns.

In addition to the Legislative Buildings, Winnipeg, as the capital of Manitoba, has many other important buildings under way. These include a fine new Agricultural College, illustrated herewith. There is a new university site of 160 acres with plans prepared for splendid buildings.

Winnipeg is rapidly improving in status as an educational and religious centre—as a result of which many new building projects are heard of from time to time. Two technical high schools just completed show a type of school building excellently adapted to the requirements of such an institution. These structures were erected at a cost of $400,000 each. The facilities afforded include forge and machine shops; woodworking, pattern-making and electrical shops; mechanical drawing and plumbing rooms, chemical laboratory, etc.

Other Noteworthy Winnipeg Buildings Described Briefly

The Boyd Building

This building is situated on the southwest corner of Portage avenue and Edmonton street. It is a reinforced concrete structure of the Turner mushroom system of construction. The frontage on Portage Ave. is 88 feet and 130 feet on Edmonton street. There are nine storeys above ground with a sub-basement 16 feet below grade. The footings extend about 18 feet below grade.

The faces on Portage Ave. and Edmonton street are finished on the exterior for the first two storeys with ornamental iron, and above with cream-colored terra cotta supplied by the North-Western Terra Cotta Company. The other sides are faced with yellow brick.

The interior is divided into stores on the ground floor with offices above, the upper five storeys being especially fitted for doctors and dentists. These offices are all fitted up with compressed air and gas. The corridors are finished with terrazzo marble floors and marble dados. The offices are all finished in oak.

There are two high speed traction passenger elevators and one freight eelvator. The whole of the building is constructed as nearly fireproof as possible, the staircases and elevators being enclosed in fireproof enclosures on all floors.

The construction work was done by the National Construction Company and Mr. John D. Atchison was the architect.

The Free Press Building

This structure is situated on Carlton street between Portage and Ellice avenues. The frontage on Carlton street is 79 feet, the depth is 120 feet, the width at the rear being 102 feet. There are six storeys above ground, each 13 ft. in height. The construction is the Turner Mushroom system of reinforced concrete. The wall foundations extend 24 ft. below grade. The building is to be used entirely by the Free Press Company and the various floors are designed to take the loads of the presses and other machinery. The building is faced with terra cotta and red brick.

On the north side of the building is a two-storey garage of the same type of construction, with a frontage of 60 feet on Carlton street. This garage will be occupied by the Detroit Electric Company. Messrs. Woodman & Cary are the architects, and Messrs. Carter-Halls-Aldinger the general contractors.

Turner & Walker Storage Warehouse

This building is situated on Henry Ave. and Ellen street. The frontage on Henry Ave. is 50 feet, the length of the building being 150 feet; the rear fronting on Higgins Ave. The building is four storeys above ground with a basement, but the footings are designed to carry five additional storeys, some of which will be constructed during 1913.

The building is of mill construction, the floors being built of planks placed edgewise and bolted together. The floors are designed to carry a load of 400 pounds to the square inch.

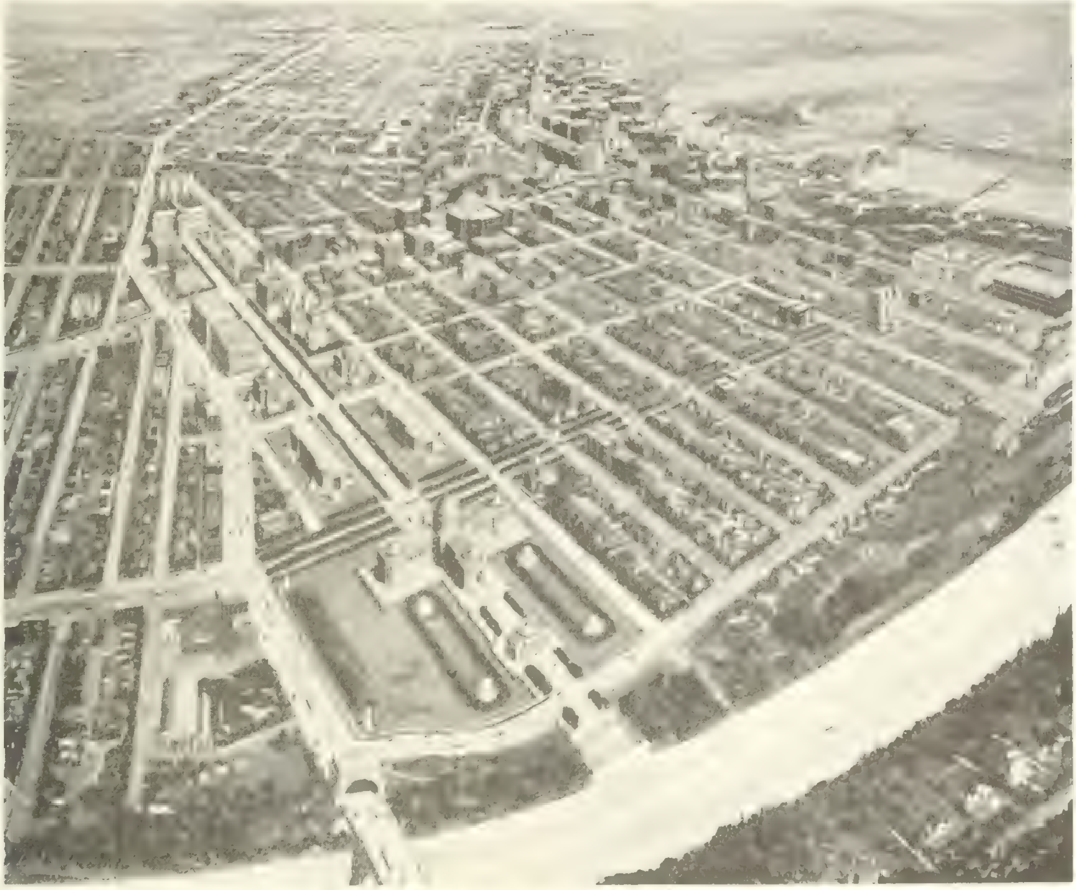
A spur track from the C. P. R. runs the full length of the building. There are five loading doors on the east side of the building and trackage for five cars to be loaded simultaneously. There is also a loading platform at the rear for the accommodation of drays.

The building is faced with red pressed brick, the first storey front and trimming courses, sills and lintels being of white stone. It is equipped with the May Oatway alarm system throughout.

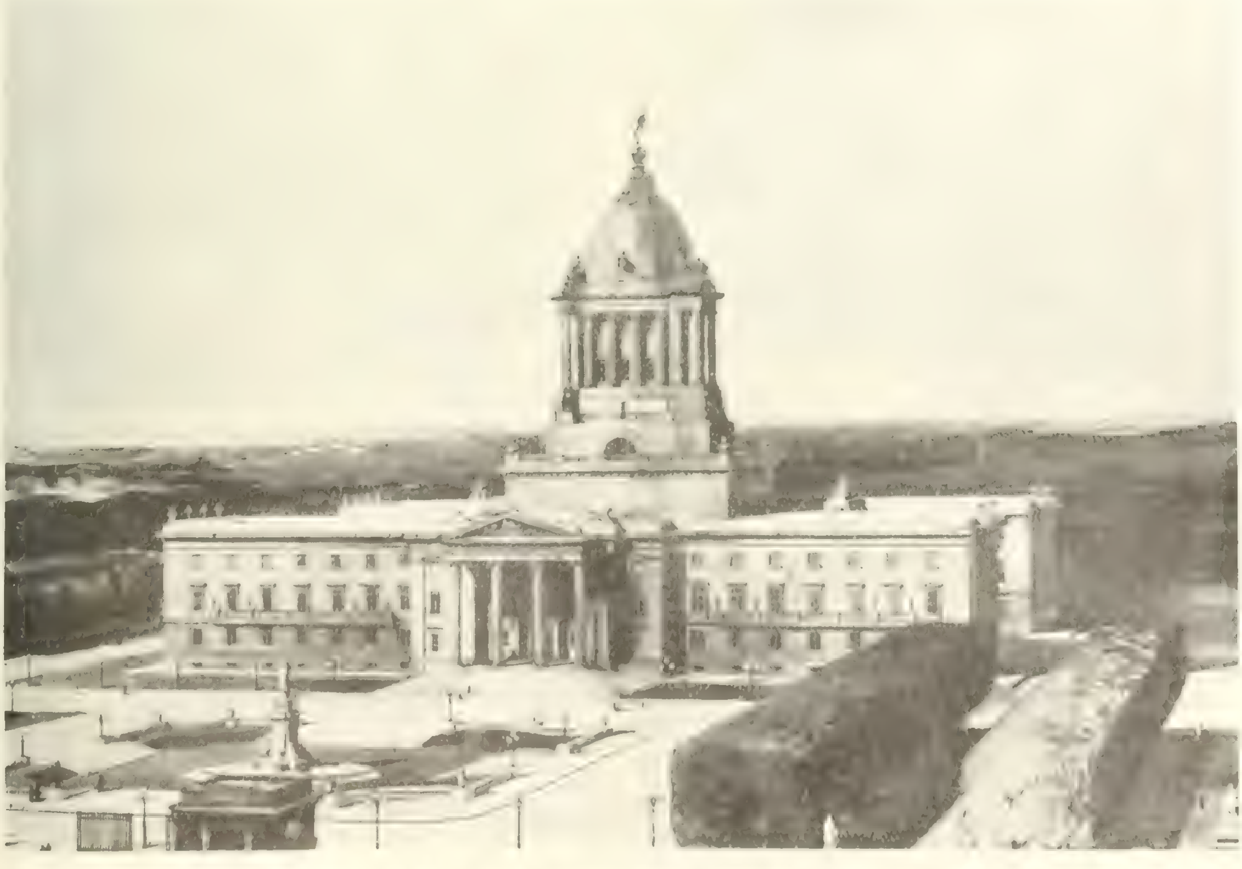
The cost of the building was more than $100,000. Messrs. Carter-Halls-Aldinger were the general contractors, and Mr. J. N. Simmens the architect. It will be occupied entirely by Turner & Walker as a storage warehouse.

Fort Garry Hotel

This building, which is now being erected for the Grand Trunk Pacific Railway, is situated on the south side of Broadway, between Fort and Garry streets, and is thus in close proximity to the new Union Depot. It is 14 storeys high and presents an attractive



Proposed new civic centre for Winnipeg



The successful design, submitted by Mr. Frank Worthington Simon, of Liverpool, England, for the Manitoba Parliament Buildings. Estimated cost, $2,000,000.

King Edward memorial hospital

architectural appearance. It is of modern construction throughout and contains 350 rooms. The frame is of structural steel and the building is faced with gray stone. The cost is approximately one and a half million dollars. It is built along the same lines as the Chateau Laurier in Ottawa but is considerably larger and will not be surpassed by any hotel on the continent. Messrs. Ross & McFarlane are the architects, and the Geo. A. Fuller Company the general contractors. It is expected that the building will be completed in June next.

Brown & Rutherford Planing Mill

Situated between Sutherland Ave. and the Riel River near Louise Bridge, this building is of the Turner system of reinforced concrete, four storeys in height, 210 ft. by 80 ft. This building is to replace the frame structure which was destroyed by fire last April. The cost of the building is $100,000.

It is entirely fireproof and is supplied with a sprinkler system on all floors, and has a blower system for the collection of shavings and other refuse. The smoke stack is of concrete, 95 feet high. Individual motor drive is to be used throughout the building, power being supplied from a power plant containing two Corliss engines each of 135 h.p. direct connected to the generators.

Extending across the entire front of the building on the ground floor are the offices of the company. The rest of this floor is used for the heavier machinery. The second floor is used as the sash and door department. The third floor is occupied by frames and large stock, while the fourth floor is devoted to the cabinet shop. Messrs. Pratt & Ross, of Winnipeg, are the architects.

Confederation Life Building

This structure is located on the east side of Main street, opposite William avenue. The building is one of the largest of its kind in Western Canada. It is eleven storeys high, of structural steel construction, with brick walls and terra cotta facings. The architect is Mr. J. Wilson Gray, Toronto, and the contractors, Messrs. Carter, Halls, Aldinger. The marble was furnished by the Dominion Marble Company, Montreal. A detailed description of the building was published in our issue of June 26, 1912.

Entrance to Armstrong's Point, a delightful district situated in a loop of the Assiniboine River

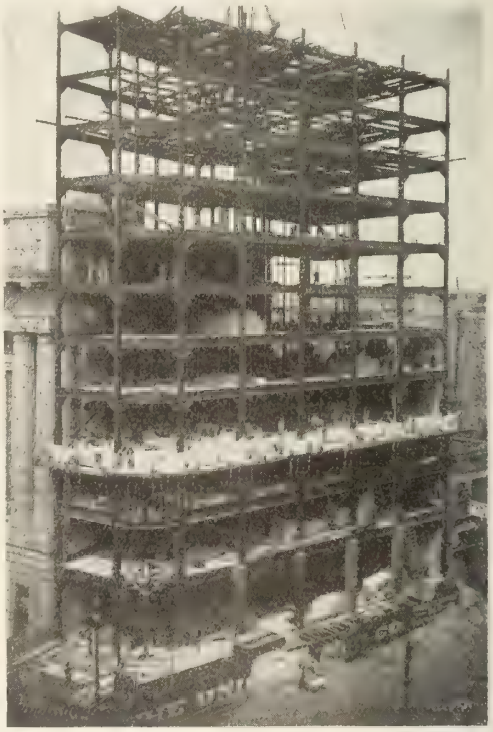
Y. M. C. A. Central Building

Situated on Vaughan street, between Portage and Ellice avenues, this building is of reinforced concrete, of the Turner system of construction. It has a frontage on Vaughan street of 147 feet, the depth being 119 ft. 8 ins. There are six storeys and basement. The front and south elevations are faced with red Menominee brick with stone colored terra cotta, and Tyndall cut stone trimmings. The rear of the building is faced with yellow brick.

The basement contains six bowling alleys, a billiard room, barber shop, kitchen, and the boiler and fuel rooms. Messrs. Hazelton & Walin are the general contractors, and Mr. J. H. S. Russell is the architect. The association have occupied the building since January 1st, although the contractors have not completely finished.

Bank of Montreal

The new premises of this institution were opened in the summer of 1912. Stands on the southeast corner of Portage avenue and Main street, the most important corner of the city, it is built of stone with six Roman Doric columns across the front. There are a flight of stone steps leading to the main entarnce. The interior finish is marble and is quite equal to the standard of the exterior. The building is one of the most impressive and commodious banking institutions on the continent.



Union Trust Company's building at an early stage. Contractors, Geo. A. Fuller Company

Sterling Bank

This is a structural steel 8-storey building on the northwest corner of Portage avenue and Smith street. It is faced with terra cotta and yellow brick. The building was scarcely completed when a large addition at the rear was commenced and rushed to completion in mid-summer. The bank occupies the main floor, the remainder of the building being rented for office purposes.

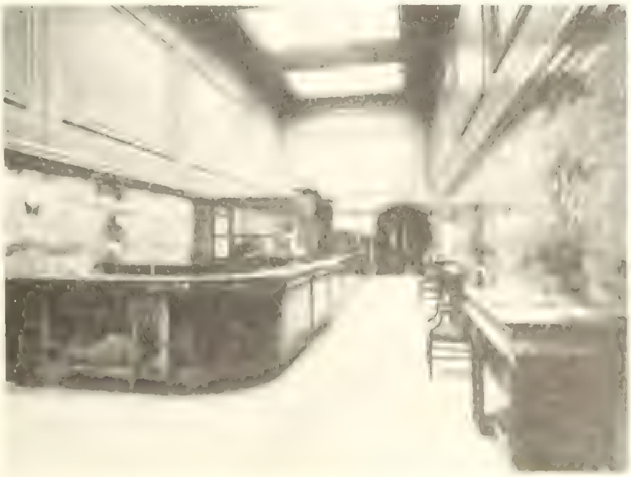
Union Trust Company's building

Administration Building, Manitoba Agricultural College

Trust & Loan Company's building, Winnipeg

Gowans-Kent warehouse, Winnipeg

Interior Northern Crown Bank, Winnipeg



Interior Alloway & Champion Building, Winnipeg

Notre Dame Investment Company's Building

This building is situated on Notre Dame avenue east, and is an eight-storey reinforced concrete structure of the Turner system. It will be used as the head office of the company with a portion rented for office purposes.

The Lindsay Block

The Lindsay Block is situated on the southeast corner of Notre Dame avenue and Garry street. It is a nine-storey office building of the Turner system of reinforced concrete construction. The building is faced with cream-colored terra cotta.

The King Edward Memorial Hospital

Opened last June, this building is situated near the Red River in the Riverview district of Fort Rouge. It is used as a hospital for advanced tubercular patients.

Industrial Progress

Winnipeg's industrial development has been along natural lines. Last year, it will be remembered, the city completed its great hydro-electric power plant (described elsewhere) which develops 60,000 h.p., supplying light and power at cost. This plant has resulted in a 33 1/3 per cent. reduction of the rate for electric lighting and has resulted in a considerable increase in industrial activity. There are now 276 factories in the city, giving employment to some 15,000 men. The amount invested in industrial Winnipeg is forty million dollars and the annual output is estimated at thirty-six millions. In 1906, according to the government census, the industrial output was slightly under nineteen millions, so that there has been a substantial increase.

Transportation Facilities

In Western Canada all roads lead to Winnipeg. Five great railroad systems centre there. The Canadian Pacific, the Canadian Northern, and the Grand Trunk Pacific railways have large shops and yards with twenty miles of switch siding facilities for manufacturers. There are now 13,000 miles of railway tributary to Winnipeg. This may be compared with 3,680 miles in 1901.

On the Winnipeg Electric Street Railway, 130,000 passengers are carried daily. The company operates nearly three hundred cars on eight miles of city tracks and sixty miles of suburban lines. Besides owning the power and street lighting plant the city of Winnipeg owns and operates its own asphalt plant, quarry and waterworks, including high pressure fire protection.

In conclusion let us say that in four decades the capital of Manitoba has made more progress than the average city does in a century. And there is practically no limitation to this progress. For years to come there is nothing in sight for the great North-West but growth and development—and in this **Winnipeg must share.**

Winnipeg Prices of Building Materials

(Dealer's prices to contractors, delivered on job)

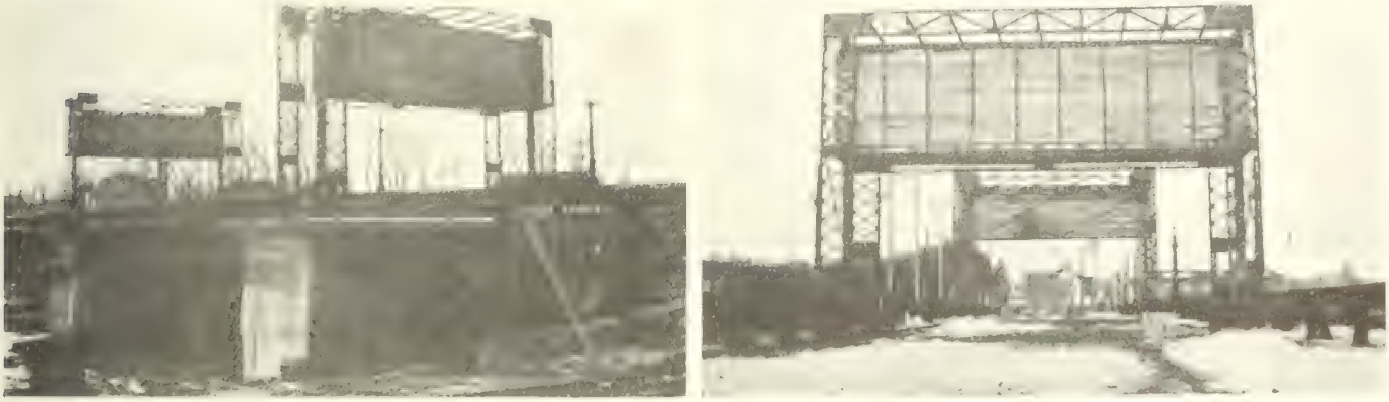
Brick, kiln run, per thousand	$14.00
Brick, sewer, per thousand	15.00
Brick, chimney, per thousand	16.00
Brick, veneer, per thousand	16.00
Brick, pressed, per thousand ....$25.00 to	50.00
Brick, enamelled, per thousand	100.00
Bricklayers' Cement (Austin's), carload lots, per bbl.	1.40
Brick Sand Lime	13.00
Brickboard Slate, per foot	.30
Building Paper, per roll	.75
Cement, per bbl.	2.50
Coal Chutes	18.00
Compo Board, per foot	.05
Crushed Stone, per yard ....2-inch, $2.50; ¾-inch	2.75
Drain Pipe (farm) ....3-inch, .05; 4-inch	.07
Fire Brick, per thousand	45.00
Fire Clay, per ton	20.00
Fire Proofing, per thousand brick measure	18.00
Flue Lining, 8½ x 8½, per foot	.25
Gravel, per yard	1.85
Hardwall Plaster, per ton	12.00
Hair (plaster), per bale	1.25
Hair Insulator, per bale	8.25
Hollow Brick, per thousand	14.00
Hollow Blocks (all sizes), per thousand brick measure	18.00
Hydrated Lime, per ton	12.00
Insulating Paper, per roll	1.25
Keene's Cement, per bag	2.25
Kelley Island Lime, per bbl. (3 bush.)	1.85
Lime, per bushel	.32
Lath (metal) .... .16 to	.20
Lath (No. 1 pine)	5.75
Mortar Color, per lb.	.05

Menominee Red Sand Mould Brick, per thousand	26.00
Nails (wire), per keg	3.70
Nails (cut), per keg	3.70
Oriental Brick, per thousand	35.00
Paper (building), per roll	.75
Paper (tar), per roll	.90
Paper (sheathing), per 100 lbs.	4.25
Plaster, per ton	12.00
Plaster Board, per foot	.03
Plaster Bead, per foot	.05
Plaster of Paris, per bag	.75
Roofing Felt (2-ply), per roll	2.50
Roofing Tile, per foot	.15
Rubble Stone, per cord	13.00
Sand, per cubic yard	1.75
Shingles (B.C. Cedar, No. 1), per thousand	4.00
Shingles (B.C. Cedar, No. 2) per thousand	3.50
Sewer Pipe, 4-inch, per foot	.08½
Sewer Pipe, 6-inch, per foot	.16½
Terra Cotta, superficial foot	1.50
Terra Cotta Facing Blocks, per foot	.25
Wall Coping, per lineal foot	.30
Wall Ties (metal), per thousand	6.00
Weeping Drain Tile, per foot	.07
Wood Fibre Plaster, per ton	12.50
Lead Pipe, per lb.	.06½
Dry Colors:	
Red Lead, per lb.; kegs	6.50
White Lead, per 100 lbs. .... $7.00 to	7.75
Gasoline, in barrels, per gal.	.24
Boiled Linseed Oil, per gal.	1.13
Raw Linseed Oil, per gal.	1.08

Important Municipal Work at Winnipeg

Power Development Greatest Undertaking—Main Features of Point du Bois Plant — Activity in Sewerage and Road Work

MANY important municipal works have been carried out in Winnipeg during the past year or so. Two police sub-stations have been erected at a contract price of $54,000. Two new fire stations have been added to the present thirteen locations. A new "Louise" Bridge has been erected on the site of the old structure at a cost of $144,126. Two new subways have been completed for McPhillips and Pembina streets, the latter being built by the Canadian Northern Railway. Other undertakings are the Hydro-Electric works, the cost of which is estimated at $3,250,000; the Arlington street bridge over the C.P.R. yards (the largest railway yards owned by a single corporation) erected at a cost of $259,880; fire alarm and signal station, Rupert avenue, contract price $62,711; and the new public baths at the corner of Pritchard avenue and Charles street, erected at a cost of $44,980.



Constructional views of the new Osborne street bridge over the Assiniboine River at Winnipeg

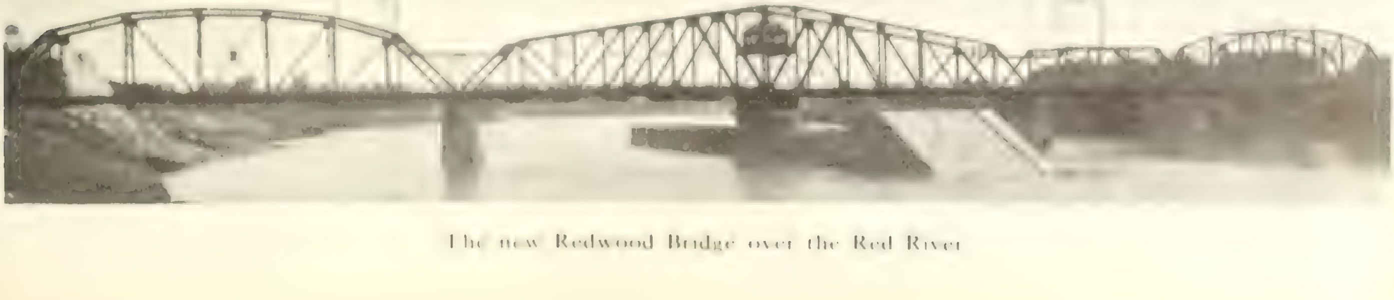
The amount expended last year on local improvements was $1,168,971, made up as follows:—Asphalt pavements, $672,675.70; cedar block pavements, $73,373.69; granolithic sidewalks, $63,201; plank sidewalks, $39,139.50; sewers, $290,409; water mains, $87,139, and boulevards, $9,032.23.

Municipal Power

The most important of these improvements is the civic light and power plant. Realizing the great advantages afforded to manufacturers, power users and householders generally by having available an abundant supply of electric energy for power and lighting purposes, the city of Winnipeg, in 1905, reached the decision to undertake hydro-electric development as a municipal enterprise. After a careful examination of the hydraulic resources of the Winnipeg river, the engineers of the city reported in favor of the site at Point du Bois, about 70 miles from Winnipeg, the estimated cost of the development being $3,250,000. In June, 1906, the ratepayers voted in favor of expending this amount on municipal hydro-electric works. The designs for the works were commenced in the fall of 1906 and tenders were received and contracts let for the general work in January, 1909, and for machinery for the equipment of the generating station in September, 1909. The construction and equipment of the system, including the transmission line, terminal station and a portion of the distribution lines in the city, was completed on October 16, 1911. Upon the completion of a 30-day test, the plant was turned over to the city for operation, and it speaks volumes for the excellence of design, construction and equipment of the works that from the time the electric power was first turned on the plant has given uninterrupted service.

The power house is constructed entirely of reinforced concrete. The building is 250 feet long, 150 feet wide and 100 feet high, and is capable of accomodating an equipment of a rated capacity of 32,000 h.p. Provision has been made for a future extension of the power house which will give an ultimate capacity of 60,000 h.p.

The present equipment in the generating station consists of five turbines with a rated capacity of 5,200 h.p. each; five generators with a rated capacity of 3,000 kw. each; six transformers with rated capacity of



The new Redwood Bridge over the Red River

One of the city trenching machines

The Louise bridge over the Red River

3,000 kw. each; two exciter generators, capacity 250 kw. each; two exciter turbines of a capacity of 400 h.p. each.

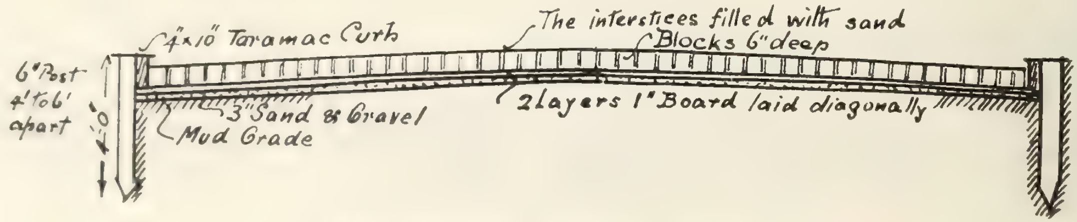
The head is 46 feet, the alternators generate at 6,600 volts, while the transmission voltage is 60,000 volts, ultimately increasing to 72,000 volts as the load increases. Final tests at the stations prove that the above equipment is capable of delivering continuously 30,000 h.p.

The transmission line is 77 miles in length, built on a private right-of-way, 100 feet wide, with two separate lines on steel towers which are set upon concrete footings and carry the aluminium transmission circuits. A separate telephone line is erected upon the right-of-way for its full length, and telephone booths are located at convenient points.

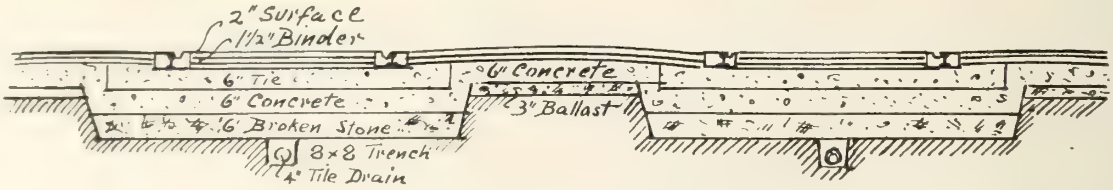
At the terminal station in the city the current is reduced to 12,000 volts and transmitted to the sub-stations in lead-covered insulated cables, carried underground in conduits. Three of these sub-stations are at present in operation and herein the voltage is reduced from 12,000 to 2,200 volts for distribution to customers by means of both overhead and underground systems for both direct and alternating current.

City Streets and Roads

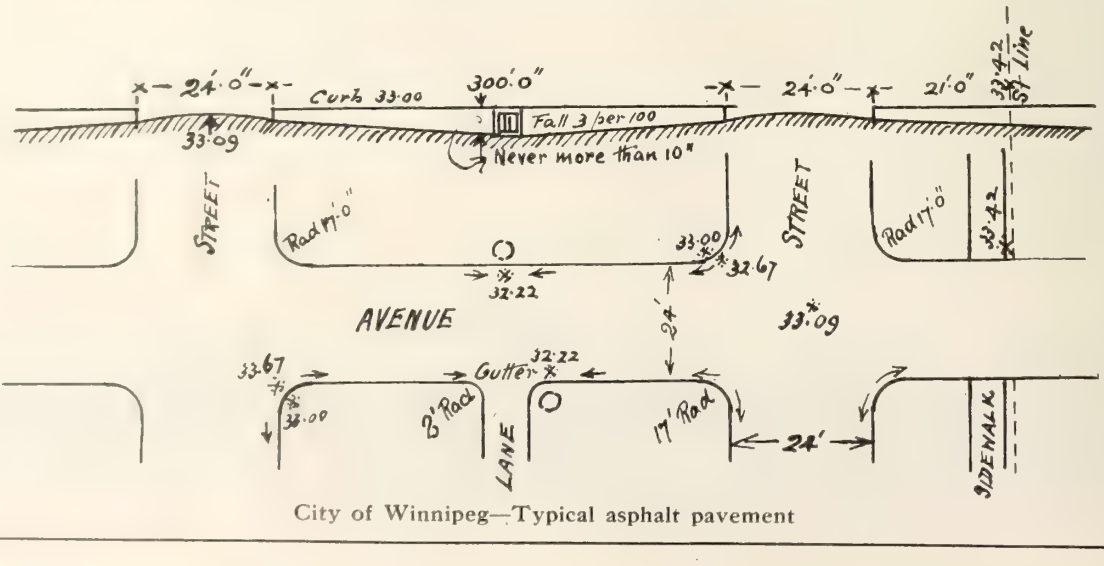
The chief thoroughfares of Winnipeg—Main street, Portage avenue and Broadway—are nearly 150



Typical section of cedar block pavement



Typical cross section of asphalt pavement, double track



City of Winnipeg—Typical asphalt pavement feet wide, other streets being less in width, but of generous and ample proportions. Main street and Portage avenue are asphalted for their entire width for some miles and Broadway has two asphalted driveways, a double-tracked car line and separating boulevards skirting the tracks. There are one hundred miles of boulevarded streets and the city has more than 520 acres in public parks. Every residential street in the city has a boulevard along either side with a row of trees on the boulevard and, wherever conditions admit, shrubs and larger stretches of clean-kept lawn.

There are over 100 miles of granolithic and 349 miles of plank sidewalks. In addition to the 80 miles of asphalt there are 39 miles of macadam, 28 miles of cedar block and 242 miles of graded streets.

The City Street Commissioner, Mr. W. F. Tallman, works in co-operation with the Provincial Roads Commissioner, Mr. A. McGillivray, towards the betterment of the roads of the municipalities surrounding the city and there is an active Good Roads Association which is doing excellent work. The Provincial Government have made provision for an annual grant of $200,000 for good roads.

The good roads movement in Manitoba, started in Winnipeg, has received added strength by an international movement and combined effort looking to the construction of the Meridian road from Winnipeg to Galveston, in Texas. This is now being taken up actively in Manitoba and by every state through which this 1,000-mile road will pass. A year or so ago, under the direction of the City Street Commissioner and the Provincial Roads Commissioner, an interesting contest was carried out in which the adjacent municipalities of Rosser, Assiniboia, St. Andrews and Springfield took part. The competition took the form of arousing interest in a cheap and efficient road implement known as the split-log drag. The commissioners and Reeve Henderson, of Kildonan, were appointed judges and made awards to the competing municipalities. The result was a strong commendation of the split-log drag and some thirty were put into use last season.

One of the seven railroad bridges over the Red River

Water Works at Winnipeg.

The city's water supply is artesian, there being some eight wells in operation at the present time, from which about 12,000,000 gallons a day are obtainable. The wells are situated in the northern portion of the city, four on the west and one on the east side of the Red River. The water for domestic supply is obtained from five wells, [illegible] feet in diameter and from 60 to 100 feet in depth. The capacity of the wells in service is 10,000,000 imperial gallons a day. The quantity of water now used daily is 8,000,000 gallons. A six-million gallon covered concrete reservoir gives ample storage capacity and sufficient water to meet the requirements of conflagration in case of necessity. The present total capacity of pumps on the domestic system is 25,000,000 imperial gallons. The supply may be increased as required by sinking more wells, at a cost of $50,000 per million gallons.

City stone pockets and crusher at Elmwood Yards, Winnipeg

In addition to the domestic system, the city has just completed a fire service waterworks system for the special protection of the business portion of the city, the water used being taken from the Red River.

For the domestic systems there are 225 miles of mains ranging from 4 to 20 inches, and 1,656 fire hydrants, , 28,714 service connections, and 23,000 meters in service. The pressure in the domestic system is 50 lbs. a square inch and in the fire system 80 lbs. a square inch. The fire service has eight miles of 10 to 20-inch mains, and 86 fire hydrants with 300 lbs. pressure per square inch. The pumping capacity of the fire service system is 12,960,000 imperial gallons a day. The fire service pumping plant consists of four units of 1,800 gallons a minute each, and two units of 900 gallons a minute each, double acting triplex—driven by Crossley Bros. single acting double cylinder tandem gas engines. The gas supply is furnished by a Crossley gas producer plant rated at 50 per cent. overload capacity. An alternative gas supply can be taken from the city mains, if necessary.

Considerable extension of the fire service system is arranged for this year, increasing the capacity of the plant by one-half.

Sewerage System

There are two hundred and four miles of sewers in Winnipeg, from 12-inch up. These are laid on the combined system, taking off surface, as well as house, drainage. They are flushed by flush tanks at the summits and by hose. The sewers are ventilated by open manholes, there being two Webb lamps in use and a

City of Winnipeg Incinerator Plant

G. T. P. railroad bridge over the Assiniboine River

number of Beeman deodorizers. Traps in house connections are optional. There are three garbage incinerators in operation.

Asphalt Plant

Winnipeg owns and operates its own asphalt plant, which is said to be the first municipally-owned plant of this kind in America. It has a capacity of 2,500 yards of "binder" and "surface" a day and a portable plant turning out 1,600 yards a day. The plant is practically of the city's own design, having been constructed by the department. Over eighty miles of No. 1 asphalt roads are laid in Winnipeg and a few miles of No. 2.

Lt.-Col. H. N. Ruttan, City Engineer, Winnipeg

Lieut-Col. Henry Norlande Ruttan, C.E., the announcement of whose approaching retirement was made in our issue of January 8th, has been City Engineer of Winnipeg for more than a quarter of a century. He was born at Cobourg, Ont., on May 21st, 1848. Previous to his connection with the city of Winnipeg he had extended experience as engineer and contractor on the construction of the Intercolonial and Canadian Pacific Railways.

Lt.-Col. Ruttan, Winnipeg's veteran City Engineer

City Engineer Ruttan has had a distinguished military career, having served in the Fenian Raids and Northwest Rebellion. He is the possessor of medals for his part in both of these expeditions. The long Service Decoration has also been conferred upon him.

He was a member of the first Council of the Canadian Society of Civil Engineers in 1887 and was elected Vice-President of that body in 1909 and President in January, 1910.

Proposed Long-Span Bridge over the Mersey

A highway suspension bridge of unprecedented span across the Mersey River at Liverpool, England, has been proposed by Mr. L. H. Chase and is described by him in a paper read before the Liverpool Engineering Society.

The largest suspension bridge yet constructed is the Williamsburg Bridge, across the East River, New York, with a 1,600 ft. main span and six car tracks, besides two roadways and two promenades. The proposed Mersey Bridge differs from it notably in the approaches, in the cable supports, in the capacity and in the live load, which is only small fraction of that computed for the Williamsburg Bridge. The proposed bridge has a main span of 2,700 feet, towers 500 feet high, has a width of 50 feet between trusses, a clear height of 200 feet above the water, and an estimated cost, exclusive of land and legal expenses, of about $4,125,000. It is proportioned for a live load of 0.72 ton per foot run and is designed chiefly for motor vehicles capable of surmounting a grade of 1:18 at the speed of 10 miles per hour, which at an allowed headway of 90 feet between them provides for 600 vehicles each way per hour.

It is proposed to support the cables on towers 300 feet apart transversely and cradle them in planes intersecting 20 feet above the roadway at the approximate vertical center of wind pressure, thus securing great lateral stability at the expense of some torsion from unbalanced loading.

The greatest novelty, however, is in the approaches, in which the grade, 3,500 feet long, is provided for by four and a half turns of a helical roadway contained in a hollow cylindrical reinforced concrete tower of 200 feet internal diameter and 300 feet external diameter, of which the 200 feet internal cylindrical space might be utilized for offices, etc., accessible from a central well.

The first use of pitch for road-making is the subject of a communication by Mr. E. W. Gudger in "Science." Pitch was used locally in Trinidad prior to 1836, the date of a book by Mr. R. Montgomery Martin in which the author describes the method of improving the roads in the district of Naparima. Eirinus, a Greek physician, in 1712 employed asphalt from the Val de Travers, Neuchatel, Switzerland, as a protective coating for stone and wooden walks; but it appears to have been used as a road-building material by Count de Sassenay in France as early as 1832. Asphalt was not used for street paving on a large scale in Paris until 1854. The material was first used on the streets of London in 1869. The first pavements of this type in the United States were laid in Newark, N.J., in 1870. The following year saw streets in New York paved with asphalt. Its use on a large scale in this country began with the rehabilitation of the streets of the national capital at Washington in 1876-77. Asphalt was know to the ancients and is said to have been used as a binder in masonry in Babylon.

A Modern Ten-Storey Office Building

Erected for the Winnipeg Electric Railway Company Blending of Granite and Terra-Cotta in Facing—Record Construction

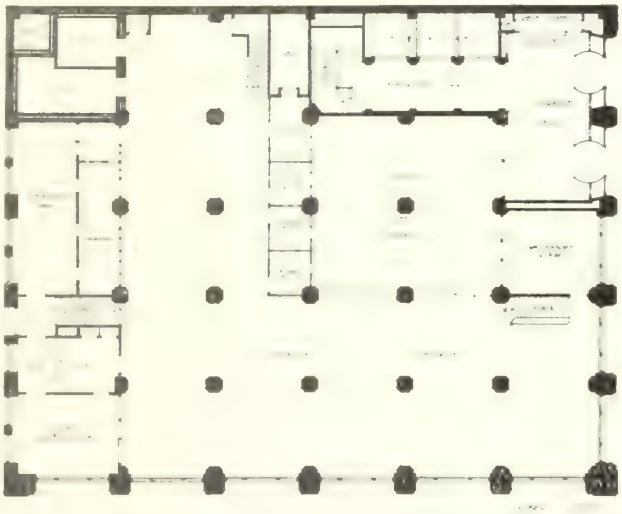
THE magnificent new home of the Winnipeg Electric Railway Company, when completed, will constitute the record for Western Canada, both as to completeness of equipment and speed of erection.

The building covers a lot on the southeast corner of Notre Dame avenue and Albert street, approximately 80 feet by 100 feet. It consists of ten storeys, basement and attic, and rises to a height of 150 feet above the sidewalk. The building rests upon 42 concrete caissons, 4 feet 6 inches in diameter, sunk 62 feet below ground level to the solid limestone which under lies the city. The excavations for these caissons were carried down about 5 feet into rock, to remove all loose stone from the surface of the rock. On these caissons are grillage beams and cast iron column bases.

Winnipeg Electric Railway Chambers from a recent photograph

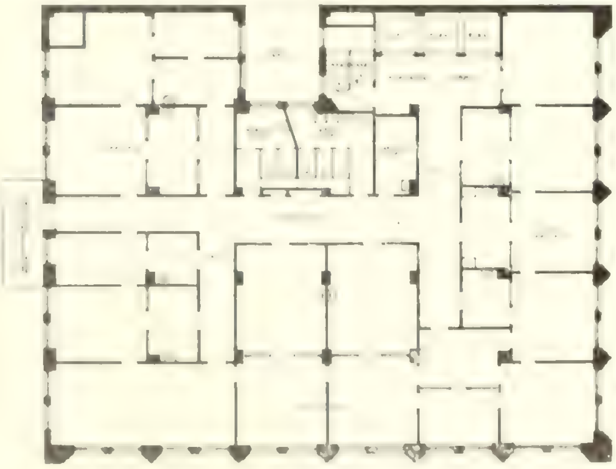
The construction of the building is a steel frame, fire-proofed with hollow tile and hollow tile floor arches. The columns are fire-proofed with cinder concrete. Hollow tile partitions are used throughout, except in the basement, where the partitions are of white enamelled brick. The plastering on the partitions is done with cement mortar floated to a stippled finish. All doors, base, chair rail, moulded architraves and borrowed lights are of steel with an enamelled mahogany finish. Wired glass is used in all borrowed lights. With the exception of the office flooring, wood has been entirely eliminated from the building.

The exterior of the two street fronts has a base of polished granite to the height of the ground floor window sills, and above that, to the third floor window sills, is fine bush-hammered granite, of a warm grey brown tint. Above that, to the cornice, is terra cotta matching the granite, in colour. The side elevation and lane are faced with a mottled grey pressed brick. The style of ornamentation used through is Italian Gothic.



First floor plan, Winnipeg Electric Railway Chambers.

The building is steam heated with automatic temperature control and is supplied with water from a bored well, 325 feet deep, in addition to a connection from the city service. The mechanical equipment includes an air-lift pump for the deep well, three centrifugal house pumps, and two centrifugal boiler feed pumps, mechanical equipment for ventilation and air washing and three high speed electric elevators.



Typical floor plan, Winnipeg Electric Railway Chambers

The basement will be used for employees of the road, conductors, and motormen's lounging rooms, inspectors' rooms, toilet rooms and public barber shop. Large storage vaults for "lost and found" articles for the company's records and for tickets and transfers, are also provided on this floor, as well as the switchboard room and ventilation equipment.

The boilers, pumps, sewage ejectors, air compressors, etc., are located in the sub-basement 20 feet below the street grade.

On the ground floor there is an entrance lobby giving access to the elevator lobby and to the general office. In the latter room, all business with the general public will be transacted, and here the ledger keepers and cashiers for the gas, electric light and power will be stationed. In the rear of this office are situated the cashiers for the conductors', and traffic superintendent's office. The conductors will enter this portion of the building from a door on the lane at the rear.

On the second floor will be located the board room, Secretary-Treasurer's Office, Manager's Office, and office for Superintending Purchasing Agent, Engineers' Department and Solicitors' Department.

The balance of the building is available for rental purposes, and is being sub-divided to suit tenants. On the attic floor, the janitor's quarters are located, also the house tanks for both hard and softened hot water. The balance is available for rental space.

Early constructional view of the Winnipeg Electric Railway Company's building.

In regard to the progress of the building, the contract was let to Messrs. Carter-Halls-Aldinger on June 10th, work on the caissons was begun on June 13th, and on July 29th all caissons were finished. On August 9th, a start was made on steel erection—placing grillage beams—and on August 23rd, the erection of columns was begun. Steel erection was completed on November 10th. Brick work on the two rear walls was started on October 19th, and about the same time the granite setting was begun. The terra cotta was started on October 25th. The building was all enclosed by December 16th, with the exception of odd pieces of terra cotta which had been broken in transit.

At the present date, all corridor and lavatory partitions are in place, and plastering is being done on the ground, seventh and eighth floors. Occupancy of the basement, ground and second floors is promised by March 31st, 9½ months after the signing of the contract.

The architects are Messrs. Pratt & Ross, and Messrs. Carter-Halls-Aldinger Company, the general contractors.

W. E. Ry. Co's. Power House

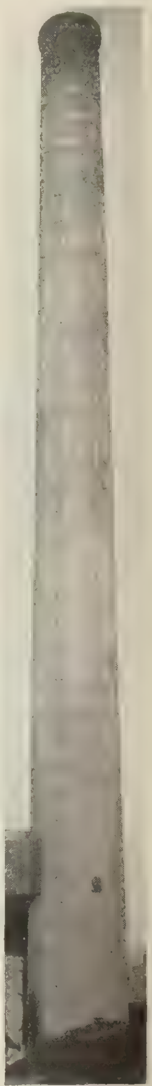
THE Winnipeg Electric Railway Company operate street cars and supply power, light and gas to the city of Winnipeg. The company own an hydraulic electric plant, situated on the Winnipeg River, about sixty-five miles distant from Winnipeg in a northeasterly direction.

This plant has a capacity of slightly over 30,000 h.p., which is transmitted at 60,000 volts to a receiving station on the banks of the Red River in the city of Winnipeg, where it is transformed down to 2,300 volts for distribution throughout the city. In this building are also situated seven motor generators to generate direct current for the operation of the street railway, and for such direct current power users as there are in the city, although most of the commercial motors are alternating current. To insure their customers against possible interruptions due to break-downs at the plant on the Winnipeg River, or against trouble on the transmission line, the company determined, two years ago, to erect an auxiliary steam plant beside the receiving station of the Red River. In January, 1911, the firm of Pratt & Ross were instructed to prepare drawings and specifications for this work, which was carried out under their supervision. The plant was put in operation in December of the same year.

The building is fireproof construction with brick walls and steel frame work supported on a concrete foundation, which rests upon 45-ft. piles driven to rock. The stack is of reinforced concrete, 13 ft. inside diameter at the top, and 256 ft. high. It is believed to be the largest stack in Canada, and is supported on 170 piles driven to rock.

The mechanical equipment consists of three Curtiss turbines with General Electric generators, each of a rated capacity of 3,000 kw., with an overload capacity fifty per cent. in excess of the above. These turbo-generators operate at 1,800 r.p.m., on 28 inches of vacuum, but are also arranged to run at atmospheric pressure if necessary. Surface condensers, vacuum pumps, and circulating pumps are so designed that any two out of the three installed will take care of the fifty per cent. overload on the plant.

The boiler room is equipped with 10 B. and W. water tube boilers, nine of which will handle the full overload capacity of the plant. These boilers are provided with automatic stokers and centrifugal turbine-driven boiler feed pumps with a double loop line of feed water piping to guard against breakdown. The coal is handled from the cars by an automatic unloader and elevated to the top of the building by a bucket conveyor system, whence it is fed into a reinforced concrete suspended coal hopper of 900 tons capacity. From this hopper the coal is fed by gravity to the mechanical stokers. The ashes are also handled out of the basement by a bucket conveyor system.

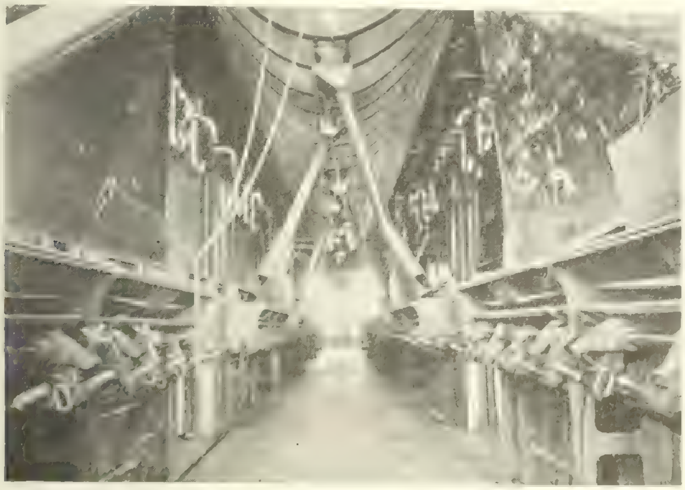


Reinforced concrete stack at the W. E. R. power house.

Circulation water for the surface condensers is brought from the Red River to a concrete screen-

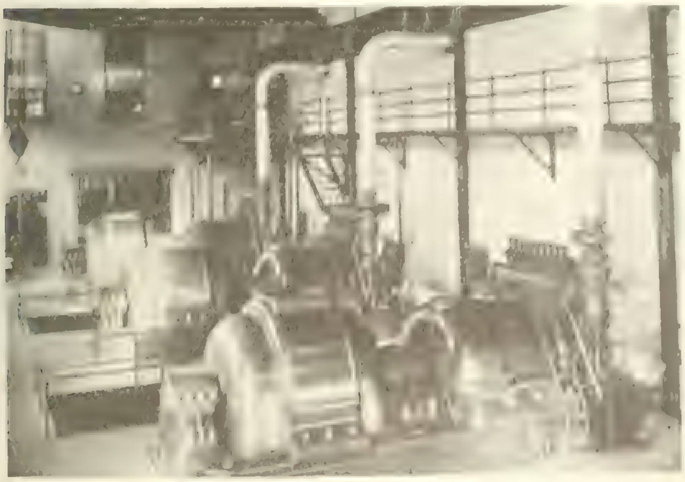
Winnipeg Electric Railway power house. Receiving station with power house addition in rear.

house on the river bank, and from there to a pump pit underneath the power house by means of a reinforced conduit. This conduit proved a very difficult piece of construction, as it necessitated tunnelling under five railway tracks at a depth of some 40 ft. below the surface. Quicksand was encountered throughout the whole length of the conduit, some 300 feet.



Winnipeg Electric Railway power house. Boiler room, showing boiler fronts, mechanical stokers and suspended coal bins.

The circulating pumps are set in a sub-basement 50 ft. below the ground line. The size of this sub-basement is 22 ft. by 50 ft. These pumps are also of the turbine-driven centrifugal type.



Generators at the Winnipeg Electric Railway power house

In the design of this plant the main object in view was to provide against any breakdown of the piping system, or auxiliaries that would have the effect of lessening the output of the plant.

The plant is connected through the switchboard by means of oil switches with the low tension busbars of the receiving station, and the turbo-generators, when operating, are run in synchronism with the water-driven generators at Lac du Bonnet.

Temperature of Concrete During Setting

In a paper read to the Iowa Engineering Society, Mr. W. D. Maxwell gives the results of tests made during the construction of the Des Moines River bridge to determine the temperature of concrete during setting. A large number of readings were taken in pipes set in the piers and abutments, the readings having been made from 5 ft. to 10 ft. below the top of the concrete and from 3 ft. 6 in. to 6 ft. from the face. A summary of the observations shows that the temperature increased from 15 deg. to 20 deg. F. within the mass during setting, and that the maximum temperature was attained in from 7 to 10 days, after which the temperature fell at a rate depending on the outside air. In pier No. 1, the temperature increased from 45 to 64 deg. in seven days, the outside temperature ranging from 27 to 44 deg. In pier No. 2 the temperature increased from 43 to 58 deg. in seven days, the outside temperature ranging from 26 to 33 deg. In the west abutment the temperature increased from 66 to 86 deg. in ten days, the outside temperature ranging from 65 to 95 deg. In the east abutment the temperature increased from 70 to 90 deg. in ten days, the outside temperature ranging from 55 to 95 deg.

In the Journal of Industrial Engineering and Chemistry, Mr. H. E. Keifer gives the results of tests suggesting that the presence of anhydrous free lime cannot be the only cause of the failure of certain samples of cement to pass the boiling test. Le Chatelier has stated that the addition of 1 per cent. of freshly calcined lime to a sound cement will render it unsound, but in the experiments by Mr. Keifer finely ground lime was added in proportions up to 25 per cent. without rendering the cement unsound. It appears that in every case the quality of the cement was improved by finer grinding or by removing the coarser particles. In other experiments wherein unsound cements were exposed to moist air at 150 deg. F., the absorption of from 0.1 to 0.27 per cent. of moisture had the effect of rendering the cements sound.

To attach plaster to concrete, make the concrete as porous as possible by omitting sand from the mix and by not spading the concrete next to the forms. Where plaster is required underneath a floor or roof, if the forms are sprinkled with ½-inch stone before the concrete is placed, a rough surface will be obtained to which the plaster will key nicely. To attach Portland cement plaster to smooth concrete, hack the surface with a point, brush the surface thoroughly to get the dust out, wash it, and in every case make sure that the under concrete is thoroughly wet before the plaster is applied, otherwise the water will be soaked out of the plaster and the plaster will not adhere. Wash the surface with grout just ahead of the plaster and make sure that the plaster is applied before the grout has time to set.

Fountain Court Apartments, Winnipeg

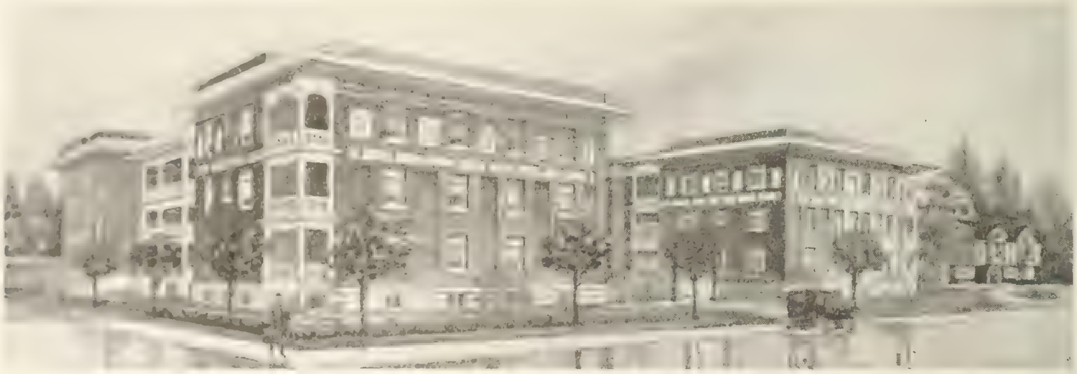
An Attractive Building Architecturally, this structure embodies many of the most Desirable Features of the Type.

Architect, Mr. Hugh G. Holman.

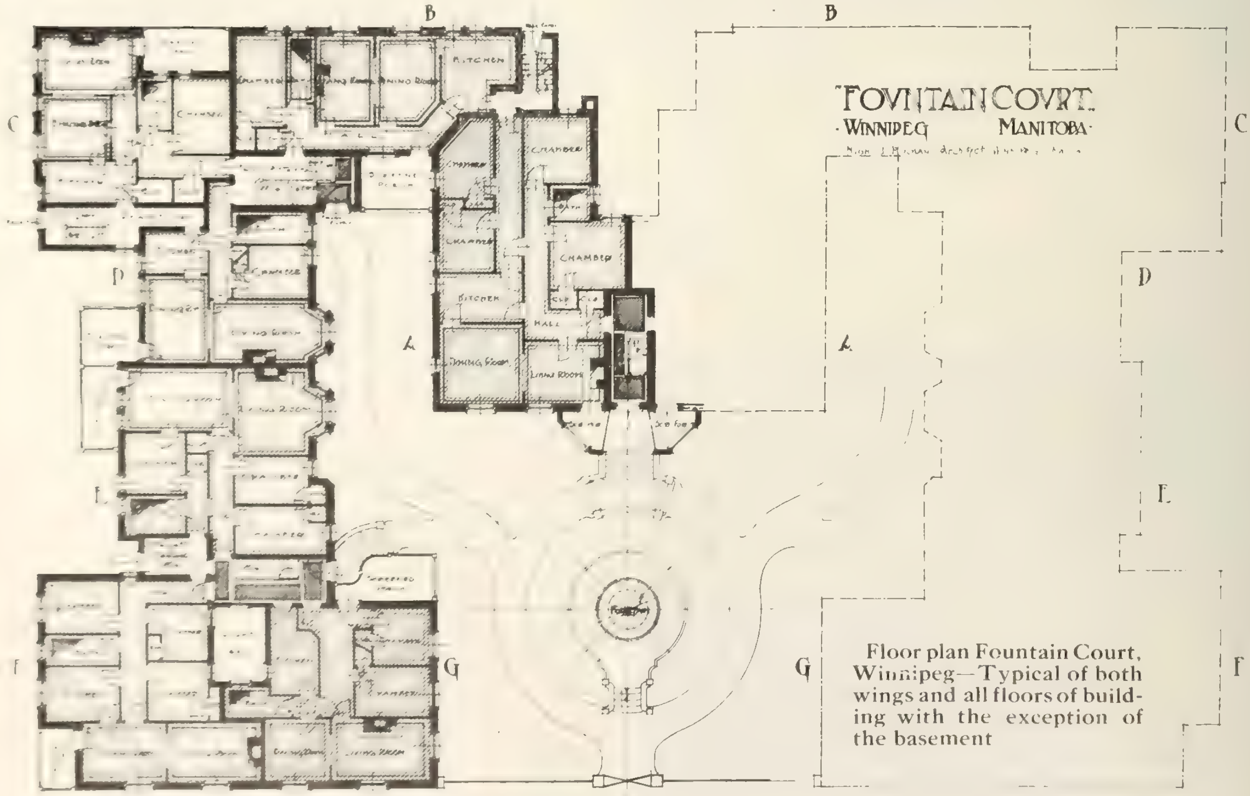
REPRODUCED herewith are a perspective and typical floor plan of the Fountain Court Apartments, Winnipeg, for which Mr. H. G. Holman is the architect. The floor plan is typical of both wings and all the floors of the building, with the exception of the basement. The basement contains six suites at the rear corresponding approximately to suites B, C and D as shown. The construction of the building is of wood floor and joist, brick bearing and fire walls on concrete footings. Each suite is isolated and all floors are insulated. The street and court fronts of the exterior are laid up in tapestry brick with stucco panels and brick ornament. The plinth course is of moulded stone and the cornice of metal.

The equipment of each suite is very complete and includes inter-communicating phones, vacuum cleaning apparatus, gas and electric cooking ranges, screened balconies, etc.

The length of the building is 190 feet and the depth 120 feet.



Fountain Court Apartments, Winnipeg. Architect Mr. Hugh G. Holman.

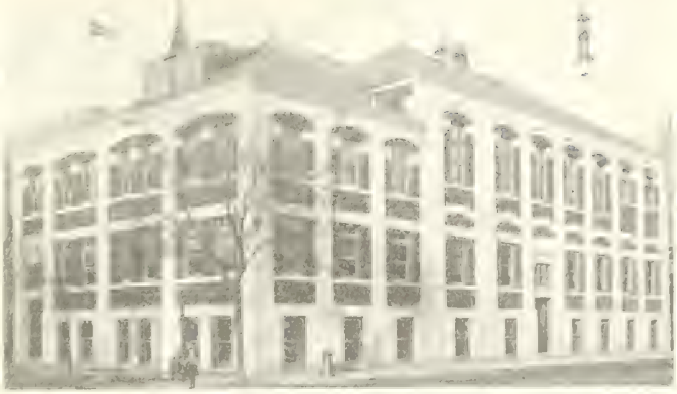


Floor plan Fountain Court, Winnipeg—Typical of both wings and all floors of building with the exception of the basement

Holy Trinity Sunday School and Club House, Winnipeg

Architect, Mr. D. W. Bellhouse

THE new Sunday School and Club House of Holy Trinity Church is built at the corner of Graham avenue and Smith street, in the heart of the city of Winnipeg, and is a two and a-half-storey brick and stone building. The dark wire cut ornamental brick, trimmed with art stone combine to produce a very pleasing effect. In the basement there is a gymnasium complete with shower baths, dressing rooms, etc. There is also a large club-room and kitchen. On the first floor are the offices, dressing rooms, club rooms, chapel and a suite of six rooms for the verger. Practically the entire second floor is devoted to a large auditorium, with stage and dressing rooms. The body of the auditorium is capable of accommodating 350 people, while the balcony will seat an additional 150. There is also a double class room and cloak room on this floor. The building was designed by Mr. D. W. Bellhouse, 703 Canada Building, Winnipeg.

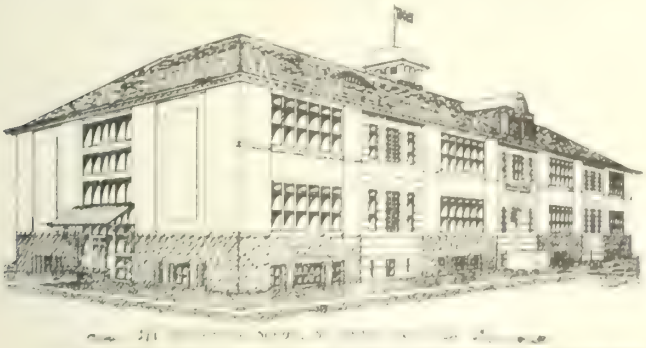


Sunday School and Club House, Holy Trinity Church, Winnipeg

Brittania School, Winnipeg

Architect, Mr. E. D. Tuttle

THE Britannia School, situated on Hampton street, Winnipeg, half a mile west of the city limits, is a two-storey building with sixteen regular class rooms. On the second floor are situated the library and domestic science room, while on the first floor are the principal's office, board room and demonstration room. The basement contains the heating plant, three play rooms, manual training room and toilet rooms.



Brittania School, Winnipeg

As this building is outside of the city limits, it is equipped with its own sewage and water works. The sewage is taken care of by a septic tank. The water works system is designed to give 50 lbs. pressure through the building, supplying water to fire protection hose. Three drinking fountains are placed in each corridor.

A compressed air plant is used to supply air for pumping water, pumping septic tank and returning condensation to boilers. The air for the temperature regulation is also taken from this system. The air compressor is so arranged that it may be run by oil engine or electric power in case of emergency.

The toilet stalls are built of steel, boiler-plate finished, white enamel. Each closet is ventilated to a steel chamber to which a fan is connected. The urinals in the boys' toilet room are of white porcelain finished flush with the concrete floor. These are ventilated similarly to the closets.

The ventilation system [illegible] built by the Buffalo Forge Company—and a Carrier air washer.

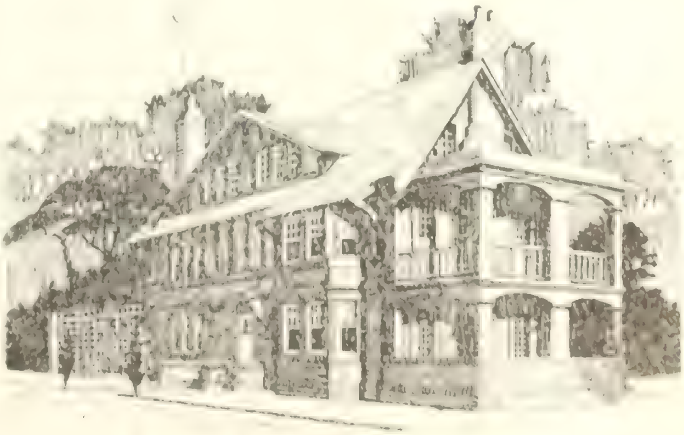
The general contractor is Mr. John Dolmer. The electrical work is by The Shipman Electrical Company, Messrs. C. C. Young Company, Limited, have done the plumbing, heating and ventilating work. The Powers system of temperature regulating is installed.

Mr. E. D. Tuttle, the architect, has designed a number of school buildings through the province. He has made a special study of septic tanks for the treatment of sewage.

Residence of Mr. David Horne, Armstrong's Point, Winnipeg

Architect, Mr. D. W. Bellhouse

THIS house, for which Mr. D. W. Bellhouse was also the architect, is of brick construction, rough cast and half timber. The dark red Oriental bricks, brown shingles and half timber make an excellent color scheme. The rough cast has been left the natural cement color and the art stone dressings afford a pleasant relief to the dark shades of the brick and timber. There is a large vestibule and entrance hall, with a wide staircase running the height of the building. The whole of the south side of the ground floor is set apart for the drawing room out of which opens a verandah. On the north side there is a den and dining room, with kitchen at the back. On the first floor there are five bedrooms and two bathrooms. The attic is fitted up as a billiard room.



Residence of David Horne, Winnipeg

Paving Construction in Western Canada

A Field of Activity, Entered Seven Short Years Ago, in which Municipal Enterprise is Now Seen at Its Best

THE laying of pavements in cities constituted an important part of the construction programme in the western provinces during 1912. The good results from the paving of a thoroughfare in one part of a city give rise to a demand for similar improvements in other sections, and the sphere of activity is eventually widened until the paving operations cover practically all parts. It is not to be expected that every street will enjoy the benefits of permanent pavements, for there is a limit to the expenditure of public money in that connection; but it is not going too far to say that there is a well-defined tendency to pave all the leading thoroughfares and also the important cross streets, which act as feeders. The strain of modern traffic demands that such a course be adopted, particularly in rapidly-growing cities. The tendency has shown itself, too, in the resolute attitude which rural municipalities, encouraged and assisted by the various provincial governments, are adopting with respect to the improvement of country roads. It is no secret that the main highways of the prairie provinces are in a deplorable state, excepting in very cold or very dry weather, and this condition is not in keeping with the enterprise which characterizes the general development of the country. From all points of the prairie one hears the demand for improved means of communication, and it is only natural that this policy should be most popular in the large centres of population.

All the Work of Seven Years

Seven years ago there was not a permanent pavement in the whole territory between Old Ontario and the Rocky Mountains, with the exception of those in the city of Winnipeg. Even Winnipeg was content at that time to have the main thoroughfares covered, little attention being given to cross streets or residential roadways. The first of the smaller cities to embark on a course of roadway improvement was Regina. Contracts were awarded by the council of that city for the paving of portions of the central streets in 1906. The far-famed Regina mud surrendered to the influence of bitulithic and wood block. The 1907 Edmonton and St. Boniface followed the good example of Regina, and undertook the permanent improvement of the roadways. In the same year Regina continued the forward policy, with the benefit of a year's experience of modern materials in the construction of pavements. In the year of reaction, 1908, Edmonton alone had courage to go on with the work. In the past four years the work has made huge strides all over the west, and every enterprising community now considers the improvement of its streets essential to its permanent prosperity. Calgary, Strathcona, Moose Jaw, Lethbridge and Saskatoon, among the cities, have seen the necessity of adopting permanent roadways, and have made liberal outlays for that purpose. The movement has gone even further. Three suburban municipalities St. Vital, Fort Garry and Assiniboia, adjoining Winnipeg on the southeast, southwest and west respectively, have given contracts for bitulithic during the past year. These contracts have been almost completed.

From this brief summary, it will be seen that the movement to improve roadways is general. All the larger cities of the west are engaged in covering up the defects of Nature's handiwork in the matter of street surfaces, and as the years go on their activities involve a larger and larger outlay. It would be inaccurate, of course, to suppose that the municipalities themselves are paying the whole cost of this progressive campaign. Nearly all the pavements are laid on the local improvement plan, which means that the properties abutting on the paved streets bear the larger part of the financial burden. The property-owners, indeed, are responsible for the municipalities' activity in pavement construction. They know that a permanent roadway will do more than anything else to make their land valuable and the ease with which they find a market for it after the pavement has been laid justifies the course they adopt. Not long ago, a writer in a Winnipeg paper made a careful computation to show that increase in value of residential property abutting the pavements in St. Boniface, Assiniboia, Fort Garry and St. Vital was sufficient in one season to meet the cost of the improvement—and leave something to spare.

Calgary and Edmonton's Good Showing

The statistics of 1912 show that about 75 miles of pavements were laid in eleven municipalities in Manitoba, Saskatchewan and Alberta. Winnipeg with 12 miles, Calgary with 20 miles, and Edmonton with 18 miles, were responsible for exactly two-thirds of this programme, the balance being divided among Regina, Saskatoon, Assiniboia, Fort Garry, St. Boniface, Moose Jaw, Lethbridge and St. Vital. Many varieties of pavement were represented, and a desire to secure the best, irrespective of first cost, was everywhere evident. The municipal authorities seemed to be desirous of giving more attention to the advisability of securing a roadway that would give satisfactory service without the necessity of constant repairs, than to the saving which might be made by taking chances with the cheaper grades of roadway material.

The traveller who has been making regular trips to western cities for the past ten years is the man who is impressed most deeply by the improvement in traffic conditions caused by the laying of so much permanent roadway. A rough calculation would probably show that more than two hundred miles of modern pavement had been laid in the eleven communities mentioned above, and the effect on traffic conditions has been startling. One might go so far as to say that in no other country in the world has so much care been exercised in the matter of improving means of roadway communication. There is no doubt that good streets have done much to bring about the state of prosperity that characterizes western cities, and the officials in all these cities are ready to acknowledge the part that has been played by permanent pavements.

The bitulithic pavement has been prominent in this programme of roadway improvement. It was first laid in the west in Regina in 1906, and it has since spread its activities to eight other municipalities.

Marion Street, St. Boniface, Man.—A creditable example of bitulithic paving.

At the Saskatchewan Capital—Lorne Street, Regina, paved with bitulithic

Paving Construction in Western Canada

Jasper Avenue, a bitulithic-paved thoroughfare of Edmonton, Alta.

The total amount laid is 1,059,352 square yards. In addition, 235,978 square yards are already under contract for 1913. In this connection it is well to remember that Winnipeg, which is the greatest "paver" of them all, uses a municipal plant and confines its activities to sheet asphalt. By so doing it enjoys all the advantages and suffers all the disadvantages that may be derived from that particular type of pavement. It would not be unfair, therefore, to eliminate that city from a consideration of the paving situation, as far as competitive undertakings are concerned. Its record in 1912 shows the extent of its popularity, if only by comparison with its achievements in preceding years. The total amount laid during the past season was 469,740 square yards, distributed as follows:—Edmonton (including Strathcona), 131,219; Calgary, 89,208; Saskatoon, 69,233; Regina, 55,399; Assiniboia, 36,032; Fort Garry, 35,874; St. Boniface, 20,836; Lethbridge, 19,227; and St. Vital, 12,712. The combined total of the bitulithic laid in western cities in 1911, 1910 and 1909 was only 468,730 square yards, and from this may be gathered an idea of its increased popularity during 1912. With contracts already signed for 235,978 yards additional, the immediate future promises continued activity.

Action of Chemicals on Concrete

The action of chemicals on concrete is commented on by George G. Kennedy, superintendent of the water department at Harrisburg, Pa. At the filtration plant hypochlorite of lime is used as a sterilizing agent and is contained in two concrete solution tanks, separated by a division wall from the mixing compartment. Both the side walls and division wall showed a great deal of pitting. The bottoms of these tanks, which are of granolithic finish, exhibited no evidence of disintegration. To check the trouble the sides were cleaned off with compressed air, a coat of cement mortar applied and the repairs finished with a coating of bitumen paint, applied hot. This work, Mr. Kennedy reports, has been finished so recently that the durability of the repairs cannot be determined, but so far the protective coating has given satisfaction.

Calgary, Alta., a city that stands third in the constructional records of the Dominion.—Twelfth Avenue, paved with bitulithic.

Residence of Sir Daniel McMillan, Winnipeg

Architects, Messrs. Pratt & Ross

THE residence erected for Sir D. H. McMillan, ex-Lieutenant-Governor of Manitoba, is situated on Wellington Crescent, Winnipeg, and was completed last November. The building is of rock-faced Tyndall limestone, with dressed stone trimmings, and covers an area of 58 feet by 72 feet.

On the ground floor, there is a magnificent hallway, 17 feet by 36 feet panelled in oak, with a carved oak mantel at the end, in Jacobean design. Off this hallway, to the left, is the drawing room, which overlooks the Assiniboine River and the terraced gardens. In front of this is the library, which contains a beautifully carved mantel, secured by the owner in Naples.

Sir D. McMillan's Residence, Winnipeg.

The dining room occupies the right-hand front corner and is panelled in mahogany to a height of 7 feet, above which the walls are covered with tapestry. In the rear of this there is a serving pantry, kitchen and servants' quarters, while to the rear of the drawing room and hall there is a wide verandah overlooking the river bank.

On the second floor, there are a sitting room, two guest chambers, and bath rooms, and owner's chamber and dressing rooms, while on the top floor are the servants' quarters, guest chambers and billiard room. The chamber floors are finished in birch, painted white, with mahogany doors. Oak flooring is used throughout in hallways and main living rooms, and white maple for the balance of the flooring.

The building is heated with vacuum steam system, and hot and cold, hard and soft water are provided for wash basins and baths. Provision is also made for heating rooms by electric appliance, and for electric cooking. In the rear of the house, there is a garage, with living quarters above and stable underneath. Entrance to the latter is secured from the lower level of the Terrace.

The architects are Messrs. Pratt & Ross, of Winnipeg.

An investigation conducted in Germany by Dr. E. Neumann leads to the conclusion that the disintegration of concrete in drains is always due to the action of some acid. The decomposition of pyrites in the soil and the oxidation of sulphuretted hydrogen in the drains have both been found as a source of sulphuric acid which decomposes the alumina and calcium compounds in cement and forms sulphates. The formation by the acid of insoluble salt breaks up the concrete by increasing its volume, and the formation of soluble salts causes more rapid destruction by permitting part of the concrete to be dissolved away. Dr. Neumann suggests as a remedy that the cement for concrete to be employed in drains should be made of dense clinker containing little lime. He also recommends that asphalt be used to protect all exposed parts, and that the interior of the drains should be efficiently ventilated.

Advantages and Disadvantages of Brick Veneer

A brick veneer house has some advantages and many disadvantages. Among the first are—that it can be constructed more cheaply than one of solid brick; that an air space is provided between the brick and the sheeting, thus making the building cooler in summer and warmer in winter; that a protection is afforded against fire from adjoining buildings; that painting is not a necessity, and its appearance makes it look well to an investor, especially one who is not familiar with building construction.

A new building, brick veneer, is satisfactory in many ways. A provision is generally made to support the weight of the walls, the window frames are made one inch wider to allow for the air space, heavier sheeting is used, and there is good opportunity to apply easily and quickly the metal ties or clips that ought to be used every fifth course to tie the brick work to the sheeting, and there is no excuse for the courses not to be level and the corners plumb.

Among the disadvantages of brick veneer are: It is deceptive; it does not support any of the constructional parts of the building; it does not afford any protection from an interior fire, and the cost of repairing any such damage would be materially increased. Veneering an old frame house is generally an unsatisfactory job for many reasons. At the time of erection no provision was made to carry the extra weight, as in a frame building the weather boarding and framing is carried to the outside of the basement or cellar walls. Then the building has settled in parts and angles and corners out of plumb, and the bricklayer has his own troubles. He is also forced to nail his clips to the sheeting, and as this is an awkward job for him the number used is liable to be greatly reduced. If a stone window still is used, the weight is too much for a single brick course, and the result is either a cracked sill or a badly settled one.

If the walls or corners are more than an inch out of plumb, it is almost impossible to remedy the trouble even by dispensing with the air space. I have found that after ten years, rust has eaten away all the metal and an attempt to plug or cut the veneer wall resulted in driving in an area of from one to three feet flat against the sheeting and the wall had the appearance of collapsing. Again, I have seen an attempt made to cut into the veneer to support the joists of a front porch, with the result that the whole front slipped to the ground.

As briefly as possible, I have endeavored to make clear what has been the results of observation and practice of twenty-five years in the building trades, and I leave the matter with my readers, assuring them that I am not too old to learn or to be convinced when good reasons are given.—Walter C. Harvey, in the National Builder.

Annual Meetings of Builders' Exchanges

Montreal, Toronto, Winnipeg and Calgary Elect Officers—Improved Organization in General Evidence—The Business in Hand

MONTREAL

Mr. James Ballantyne presided over the annual meeting of the Montreal Builders' Exchange, on Monday, January 20th.

The report dealt in detail with the various subjects which had come under the consideration of the directors during the year. It was stated that 1912 was one of the best in the history of the exchange. During the past twelve months agreements had been signed with several trades. Other branches of the building interests seemed to be flourishing and the persons engaged in them contented. Mr. J. H. Lauer, the secretary, had resigned, to the regret of the directors, but the exchange had secured a successor in the person of Mr. R. L. Werry, at one time engaged on the Montreal staff of Hugh C. MacLean, Limited. The directors had taken up the question of an increase in the duty on stone, and numerously signed petitions would, it was expected, come before the House of Commons next month. It had been found that the conditions and the requirements of the different branches of this industry—granite, marble, sandstone, etc.—were so different that difficulty had been experienced in presenting a united front; but a solution of the problem was confidently looked for.

Mr. Joseph Brunet, President Montreal Builders' Exchange

Lien Law and Compensation

Referring to the uniform form of contract which had been agreed on, it was stated that "tender" forms or estimating scales for different classes of work were needed quite as badly as were the other forms. The Quebec Lien Law was discussed early in the year and some of the members gave the matter considerable study. The incoming executive would do well to take up this important question and formulate some amendment that would be of decided benefit to contractors throughout the Province. The Workmen's Compensation Act, as interpreted in some quarters, bore heavily upon all concerned—except the injured. It was not reasonable that the charges, in many instances, should fall wholly on the contractor. In fact, the contractor was bound to add the cost of the premiums for the protection of his employees to the price of his contract, not having a separate bank account of sufficient proportions to fall back upon in the way of self-insurance. Consequently, the proprietor through the contractor and the insurance or guarantee company must pay the bill. There were many phases of this subject that called for careful study. They were being discussed by sister Exchanges in Canada and the United States, and it would seem to be the part of prudence that the matter should be gone into at an early date—before spring opened if possible.

The report then detailed the negotiations which had taken place in reference to demands for higher wages for some branches of the building trade, and the directors stated that they anticipated no serious trouble in any department of the trade during the coming season. The relations between labor and employer in Montreal were, probably, never more cordial than at the present time. Recent negotiations revealed a tendency on both sides to consider the demands and requirements of the other in a spirit of fairness and justice, and to concede as much as possible when there was reciprocal disposition shown by the other parties to the treaty. At the same time there was no weakness shown by members when demands were manifestly unreasonable. With such conditions obtaining between employer and employee it might not be out of place to suggest that a movement should be taken up at once to secure a better working understanding among contractors. In abnormally busy times such as Montreal builders experienced during the past season there was a tendency to disregard the proper code of practice in the relations with one another. General contractors, being the stronger, might attempt to raise wages unduly and thus entice workmen from smaller contractors, who suffered as a consequence. This practice was not in the interest of the employer on the building business as a business principle. Cutting prices, sometimes for the sake of competition and not infrequently through ignorance in connection with estimating, was another serious matter that should be taken up by a committee and have the sympathetic co-operation of the entire membership. Unless these matters were dealt with their interests were bound to suffer. A revision of the general code of practice was most desirable, for the purpose of which a strong committee representing all branches of building operations should be formed, and their conclusions and enactments should be made official and effective immediately upon ratification by the Board of Directors, the same to be confirmed or amended at the next annual meeting as experience might dictate. Competition might be the life of trade, but friendship among competitors was not at all impossible.

Montreal Building Bylaws Criticised

On the subject of the building by-laws, the report stated that the present by-laws were a farce, not fit for a small town, and the method taken to improve them did not show much concern or seriousness on the part of those into whose hands the safety, health and well-being of the citizens were committed. After a protest against the absurd system of building permits in Montreal, which greatly under-estimated the value of building, the directors referred to the inadequate transportation facilities available. This was due to lack of railway cars, carts, horses, and men; while as regards the use of tramways for freight, contractors had suffered owing to a dispute between the Tramways Company and the civic officials.

The balance sheet showed an income of $11,931 and a balance in hand of $192.

The president, in his speech, alluded to the more important topics dealt with in the report, and stated that although contractors had raised wages in certain trades, Montreal was still below Toronto, Winnipeg and other places in the matter of the scales paid.

The election of officers and directors for 1913 resulted as follows:—President, Mr. Joseph Brunet; first vice-president, Mr. Thomas Gilday; second vice-president, Mr. Frank Pauze. Directors—Mr. John Allan, representing the general contractors; Mr. E. Richardson (of Richardson, Simard & Company), representing the roofers; Mr. Kennedy Stinson (of Stinson Reeb Builders' Supply Company, Limited), representing the builders' supply dealers; Mr. P. S. McKergow (of the Laprairie Brick Company, Limited), representing brick interests; Mr. J. B. Gratton (of J. B. Gratton, Limited), to represent the carpenters; Mr. John Quinlan, to represent stone and masonry interests; Mr. William Rutherford (of Wm. Rutherford & Sons Company, Limited), representing lumber and mill interests; Mr. William E. Potter (of Wm. E. Potter & Company), representing the master painters; Mr. T. A. Morrison, representing the quarrying interests; Mr. J. R. Meadowcroft, representing the master plumbers; Mr. F. B. Locker, representing the mantle and tile dealers; Mr. E. W. Sayer, representing the electrical contractors.

A bonus of $150 was voted to Mr. R. L. Werry, the secretary.

TORONTO

The annual meeting of the Builders' Exchange of the city of Toronto was held on January 20th, when about eighty members were present. The President, Mr. Geo. Gander, in the course of his address, stated that trade during 1912 had been handicapped by want of material and shortage of labor. The financial standing of the exchange at the end of 1912 showed a considerable improvement over 1911. The membership during 1912 had been increased by 85 and there were 27 applications coming up to be confirmed. The committee appointed by the exchange had done good work on the revision of the present Contract Form and another committee had also rendered valuable assistance in the matter of the Workmen's Compensation Act. In 1912 a firm of solicitors, Messrs. Mulock, Lee, Milliken and Clarke, had been appointed advisory solicitors to the exchange. The officers for the ensuing year are Mr. Chas. Bulley, president; Mr. Geo. Oakley, Jr., vice-president; Mr. G. W. Britnell, second vice-president; Mr. J. W. Aldridge, treasurer, and Mr. T. L. Fraser, secretary.

Mr. Chas. Bulley, President Toronto Builders' Exchange

A meeting of the Provincial Builders & Supply Association of Ontario will be held at the Builders' Exchange, Toronto, on February 11th. This will be purely a business session and all the builders of the province are invited to attend.

CALGARY

The annual meeting of the Calgary Builders' Exchange was confined to the election of officers. Mr. R. A. Brocklebank was unanimously chosen as president and other officers were elected as follows:—First vice-president, Mr. James Marr; second vice-president, Mr. R. J. Priestly; third vice-president, Mr. Fred. Jones; sergeant-at-arms, Mr. J. J. Gracie. Mr. A. Stewart was elected a director to fill a vacancy until December 31st, 1914, while the following will have places on the board for the full term of three years:—Messrs. C. A. Clancy and S. B. Ramsay, F. L. Magee and F. L. Streight.

Mr. R. A. Brocklebank, President Calgary Builders' Exchange

The General Contractors' Association has elected Mr. R. A. Brocklebank chairman, and Mr. Fred. Jones vice-chairman.

WINNIPEG

At the annual meeting of the Winnipeg Builders' Exchange, reports received from the president and secretary showed the exchange to be in a most flourishing condition. The progress of the year has been of much more stable nature than heretofore and the benefit of the changes made in connection with the executive staff a year ago are now quite apparent. In all departments the exchange is now on a much better footing.

The following officers were re-elected:—W. J. Davidson, president; Fred. Hinds, first vice-president; John MacQuarrie, second vice-president; T. D. Robinson, treasurer. The following directors were elected, some of them for the second term:—W. [illegible], secretary-treasurer of the Winnipeg Paint & Glass Company; J. W. Morley, W. P. Alsip and H. C. McMartin. A. M. Rose was re-elected secretary, and in all departments the exchange will be practically in the same hands as before.

Toronto Branch C. S. C. E.

The annual meeting of the Toronto Branch of the Canadian Society of Civil Engineers was held on January 23rd. The principal event of the evening was the election of officers, which resulted as follows: chairman, Mr. E. A. James; secretary-treasurer, Mr. A. B. Garrow; executive committee, Messrs. P. Kimble, E. Brandon, W. A. McLean and T. C. Irving, Jr. There was considerable discussion during the evening regarding the free importation of plans from the United States. It is contended that the Canadian Government is losing thousands of dollars each year through the failure of its officials to collect the five per cent. tax required by the tariff. Active remedial measures will be taken

Municipal Work at Nanaimo, B. C.

The continuous growth of the city of Nanaimo is evidenced by facts detailed in the annual report of the City Engineer, Mr. S. Barlow Bennett. Interesting particulars are given concerning the construction of an 18-inch diameter wooden water main and the general improvement of the distribution system of the city. The sum of $50,000 had been voted for the extensions. The total length of the supply pipe is 10,080 feet. The pipe was supplied by the Dominion Wood Pipe Company, Limited, of New Westminster, B.C., who gave a five-year guarantee with their product.

The whole of the excavating, tamping and filling was done by the city workmen. A large amount of conglomerate rock was met with about half a mile from the dam. This hindered the work and increased the cost of excavating. When crossing a creek, four concrete piers were constructed strong enough to carry the 18-inch wooden main and the present 12-inch cast-iron main. Some difficulty was experienced in making the heavy castings for the pipe-line, special patterns having to be made before castings could be obtained.

At the outlet from No. 1 dam, a concrete chamber has been designed and built. The chamber has been arranged to hold the screens and also to act as a flush-out from the dam when so required.

The distribution system to the Newcastle townsite has been much improved, six inch mains having been laid on Vancouver avenue, Union avenue, and Second streets, and a four-inch main on Fifth street. The whole of these mains have been put in circuit with the six-inch main which is laid across the bridge.

The city now has 18 miles of concrete side walks, of which five miles were constructed in 1912. The average year cost, including grading, was $1.15 per square yard.

The building permits for the year represented an expenditure of $321,422, as compared with $159,461 for 1911. . At the present time a number of important buildings are projected or under construction. These include an addition to the Windsor hotel, the Addison apartment block, the Crescent Theatre and proposed additions to the Grand and Eagle hotels. Mr. Bennett recommends the preparation of a revised building ordinance.

Plans and profiles of the Newcastle townsite sewerage scheme were prepared during September and October last, and approved by the engineer of the Provincial Board of Health, work being commenced on October 31st. It was originally proposed to have two main outlets for this district, but during construction it was found that by increasing the depth of the cut of Newcastle avenue, the whole of the sewerage could be discharged through one outlet into deep water, by carrying a 12-inch cast-iron flange pipe from the manhole on Fifth street. This work has progressed in a satisfactory manner.During the year nearly 23,000 feet of sewers were laid in the city and in Newcastle townsite.

Reference is made to the subject of waste refuse, and the installation of a destructor or incinerator is recommended.

The proposed work for 1913 shows a considerable increase in sewer and paving construction.

Canadian Railroad Development

The Canadian Pacific Railway Company have decided to extend their shops and round houses at Nelson, B.C.

Contracts were awarded recently by the Canadian Pacific Railway for 807 miles of new lines to be constructed in the west during the present year.

Work on the Grand Trunk Pacific's twenty-million-bushel grain elevator at Fort William is being pushed to completion. With the latest addition, the capacity is at present about six million bushels.

Hon. Frank Cochrane, Minister of Railways and Canals, recently gave out the statement that the Trent Valley Canal would be rushed to completion before the end of the present year.

The Canadian Pacific Railway has in course of construction at North Transcona, six miles east of Winnipeg, what will probably be one of the largest and most complete clearing yards on the continent, having an ultimate capacity, when developed, of over 12,000 cars. It is stated that the work is about completed.

The Canadian Northern Railway Company will lay steel into Calgary within a few weeks, the end of steel being now only four miles from the city limits. From Calgary the engineers will connect the Goose Lake extension with the main line to Saskatoon. Of the extension there remains to be finished only thirty miles and the road is expected to be in operation over this section early in the spring.

The Canadian Pacific Railway Company recently announced that construction work on their new passenger station at Vancouver would be commenced at once. The new station, which will be four storeys high, and have a frontage of 400 feet, will be of imposing character and cost approximately $1,250,000. The contractors are Messrs. Westinghouse, Church, Kerr & Company, of Vancouver, and the architects, Messrs. Barott, Blackader & Webster, of Montreal.

A delay of a fortnight to give the City of Toronto time to consider the viaduct proposals of the railway companies was the outcome of the conference held at Ottawa on January 20th between the Dominion Railway Board, the engineers of the Canadian Pacific Railway and Grand Trunk Railway and representatives from the Toronto Board of Trade, Harbor Board and civic government. Chairman Drayton stated after the meeting that owing to developments during the discussion the city had been granted two weeks in which to decide finally on the relative merits of the two viaduct propositions.

Messrs. Bates & Rogers Construction Company, Spokane, Wash., and Chicago, Ill., have been awarded a contract by the Grand Trunk Pacific for the construction of all bridges and tunnel lining on the line between Prince Rupert and Edmonton, Alta. The cost of the work is estimated at $2,000,000. The first work on the job has just been started by the company, bridge gangs and tunnel lining crews having begun operations both at Edmonton and a short distance east of Prince Rupert. It is the present intention of the company to have these two large forces of men work toward each other and one or two more big crews probably will be put to work about midway between Prince Rupert and Edmonton in the near future.

A report on the work carried out last year on the western lines of the C.P.R. shows that new tracks, covering a distance of more than 500 miles, were graded, these being mostly new branch lines to Alberta and Saskatchewan, while 450 miles of track were finally completed and turned over to the operating department. Every terminal from Fort William to Vancouver was enlarged, and construction was begun on the new station at the Pacific Coast terminal. Large sums were spent on bridge building. The bridge, 3,004 feet in length over the South Saskatchewan River was opened to traffic, while three-fourths of the work on the high level bridge at Edmonton was completed. Buildings in connection with the Ogden shops were finished, and machinery and staffs are being organized for an early opening. Equipment was largely added to, including some thousands of new freight cars, while the million ton coal handling plant at Fort William was among the many other improvements of the year.

Progress on Mount Royal Tunnel

The Canadian Northern Railway have completed the first mile of heading in connection with the Mount Royal tunnel, and it is officially announced that the heading will be completed by October, while the tunnel will be finished a year from now. Great progress is being made at the Model City side of the mountain, and already well over half a mile of heading is finished. About eighteen feet of heading each day is bored at that end of the work. Little trouble has been experienced so far by reason of the nature of the rock. A few small springs were met with but they did not seriously interfere with the work. The rock is practically all limestone. Five separate headings are now being made. The shaft at Dorchester street is in the centre for operations northward towards the mountain and southward to the St. Monique street entrance. Another shaft at Outremont is being worked both ways, and the entrance at the Model City is the commencement of the fifth heading. The stone that is taken from the heading at this spot is being used for the construction of one of the main roads in the Model City.

C. P. R. Work at North Transcona

The C.P.R. has in course of construction at North Transcona, six miles east of Winnipeg, what will be one of the largest and most complete clearing yards on the continent, having an ultimate capacity, when developed to the extent laid down in the present layout, of over 12,000 cars. The work is about completed. The yards are divided into two divisions—the major and the minor yards. The former, consisting of the eastbound receiving yards, the westbound classification and departure yard, and the westbound receiving yard, are each large yards symmetrically arranged about a central line through the summit of the humps, facilitating access to all parts of the grounds. The yards have been designed to relieve the company's Winnipeg yards, which are believed to be the largest in the world, but which, from rapidly increasing traffic, principally in grain, have become so over-crowded as to demand increased facilities. Traffic from the west will come out from Winnipeg through Whittier Junction and to the yards, over the main line, branching off into the yards at their west end, three tracks leading in. Parallel to these entry tracks, it is the ultimate intention to construct a sixteen-track grain yard, with a capacity of 730 cars to form part of the eastbound hold yard. A summary of the development as ultimately planned is as follows:—Westbound receiving yard, 30 tracks, 2,090 cars; westbound classification and departure yard, 40 tracks, 2,740 cars; eastbound receiving yard, 30 tracks, 2,090 cars; eastbound classification and departure yard, 40 tracks, 660 cars; eastbound hold yard, 24 tracks, 1,100 cars; eastbound caboose yard, 7 tracks, 40 cars; westbound caboose yard, 7 tracks, 40 cars; repair yard, 32 tracks, 410 cars; transfer yard, 8 tracks, 225 cars; icing yard, 6 tracks, 200 cars; coal storage yard, 80 cars; engine yard, 48 engines.

Interesting Legal Decision

Contractors and architects will be interested in an action which has just been decided by Mr. Justice Guerin, in Montreal. It establishes the validity of final certificates given by an architect to a contractor, as evidence that the work had been carried out.

The plaintiffs were D. G. Loomis and Company, contractors, Montreal, who claimed $6,698.12 from the proprietors of the Blumenthal building on St. Catherine street, as balance due on the contract price as well as for added expenditure in connection with extra work done at the behest of the architects.

Defendants, whilst admitting the final certificates issued by the architects, claimed that such certificates had been given in error, without right against defendant's express wish, in violation of the terms of the contract and by connivance and collusion between the contractors and the architects. They further claimed that the contractors had failed to deliver the building at the time called for in their contract and that they had neglected to carry out the plans and specifications and had made changes and variations. Certain work to the value of $2,345.34 had been omitted, whilst work badly done amounted to $5,529. Defendants admitted having by error paid for certain extra work, and claimed that the final certificates had been given by the architect despite the protest by defendants.

The contractors made answer that whatever extra work had been done or whatever work had been omitted, had been done or omitted on direction of the architect, in accordance with the specific terms of the contract.

His Lordship, in summing up the evidence adduced on both sides, pointed to the contract passed between the contractor and the owners. In the first place, according to this writing, all the work was to be carried out under the direction of the architects, whose decision as to the true construction of the drawings was to be final. No alterations were to be made in the work, unless on order of the architects. The work was to be completed by April 1st, 1911, but should the contractors be delayed, otherwise than by their own fault, the time for completion of the work was to be extended, such extension to be determined by the architects. No certificates or payment made under the contract, except the final certificate or final payment, was to be regarded as conclusive evidence of the performance of the contract either wholly or in part.

The contractors, continued His Lordship, had proceeded with the work, under the direction of the architects, up till January 31st, when they rendered defendants a statement for extra work to that date. To this statement defendants objected, but on February 21st, a settlement was arrived at whereby defendants acknowledged that the amount, additional to the contract price due to the contractors up to that date, was $7,813.67. March 24th, the contractors notified defendants that the building was practically complete. April 3rd, certain tenants entered the premises, whilst the evidence showed that defendants themselves had occupied the building [illegible] periods between April 5th and 25th. On July 25th the contractors received final certificates from the architects. The evidence showed that at that date there was a balance of [illegible] due to them. The Court [illegible] gave judgment for that amount, holding that plaintiffs had proved the value of the materials and work for which they charged.

Canadian Consulting Engineers

The John Galt Engineering Co., Limited, Winnipeg

THE firm now known as the John Galt Engineering Company, Limited, owes its origin to the consulting engineering practice carried on by the late John Galt which extended over a period of some twenty-eight years, dating from 1882. In 1907 the partnership of Galt & Smith was formed with Mr. O. W. Smith, and was continued until early in 1910 when Mr. Smith retired to go into contracting, and the present organisation was arranged. The senior member of the present firm is Mr. John Haddin, A.M.Inst.C.E., A.M.Can.Soc.C.E., and his partner is Mr. E. L. Miles, A.M.Can.Soc.C.E. The company was recently incorporated with offices in Winnipeg, Calgary and Vancouver.

Mr Haddin was educated at the Glasgow (Scotland) High School and afterwards took a course in the Glasgow Technical College, serving his apprenticeship concurrently. At the termination of his course he took his engineering diploma and passed the examination of the Institution of Civil Engineers. His professional career commenced in 1901 as assistant to Mr. T. O. Niven, M.Inst.C.E., of Glasgow. Mr. Haddin had charge of various water, sewer, railway and other works, including a portion of the Glasgow main drainage works. He devoted special attention to the question of sewage disposal, which at that time was receiving much attention in Great Britain. From 1904 to 1906 he had full charge of the design and construction of sewage disposal works at Moffat and Milngavie, and of waterworks at Millport and Kilmarnock, Scotland. During this period many other important works came under Mr. Haddin's supervision, these including road, bridge and harbor construction.

Mr. John Haddin, of the John Galt Engineering Company, Limited, Winnipeg

In 1905 Mr. Haddin was elected an Associate Member of the Institution of Civil Engineers. Two years later he came to Canada and became identified with Messrs. Galt & Smith of Toronto, in charge of waterworks at Banff, Alta., and Maple Creek, Sask. An undertaking that was entrusted to Mr. Haddin a year or so later was the design and construction of sewers and sewage disposal works at Vernon, B.C., this being the first modern municipal sewage disposal works to be installed in Western Canada. Mr. Haddin designed and carried out similar work at Wetaskiwin, Alta., and also the waterworks at Taber, Alta.

In 1910 Mr. Haddin effected a partnership with Mr. John Galt in the John Galt Engineering Company.

Mr. E. L. Miles was born at Port Arthur, Ont., in 1883. He was educated in New Brunswick, in which province he obtained his first engineering experience as a rodman on the location and construction of the Restigouche and Western Railway. Later he obtained valuable experience with the Dominion Iron & Steel Company, of Sydney, C.B., and the Bangor and Aroostook Railway at Houlton, Maine. In 1903 he obtained a position with the Big Four Railway and served on the construction of their double track cut-off into St. Louis City, Mo., gaining much useful experience in monolithic concrete work. From 1904 to 1908 he was with the Canadian Pacific Railway at Toronto in the respective positions of resident engineer, chief draftsman and assistant division engineer on the Toronto-Sudbury branch. Early in 1909 he became associated with Messrs. Galt & Smith as resident engineer in charge of the construction of the waterworks and sewerage systems at Wetaskiwin, Alta. Subsequently he became a member of the John Galt Engineering Company. He is at present manager of the firm's Calgary office.

Mr. E. L. Miles, of the John Galt Company, Limited, Winnipeg

A subsidiary company controlled by the same partners and now known as the John Galt Construction Company, was also formed in 1911, having headquarters at Vancouver. This company constructed a concrete dam on Bull River, B.C., for the C.P.R. Irrigation Department in the winter of 1911-12, and at present has in hand the contract for substructure of Bridge No. 3 of the Canadian Northern Pacific Railway at Lytton, B.C., besides other work.

Canadian City Engineer's Valuable Book

Mr. S. Barlow Bennett, City Engineer of Nanaimo, B.C., is the author of "A Manual of Technical Plumbing and Sanitary Science," a practical treatise which on account of its value and importance enjoys a very large sale in the Old Country. A copy of this book has recently come to our attention and we have perused it with much interest. While English and Canadian plumbing practice vary in many notable details, the underlying principles of sanitation are standard, and so we have no hesitation in recommending a reading of this work to those who are specializing in the branch, or who may be desirous of becoming well posted therein. The copy now in our hands is one of the second edition, in which the reading matter is brought up-to-date and rendered additionally valuable by fresh illustrations. The typical and general arrangement throughout facilitate ready reference, and as each chapter is complete in itself, each subject can be mastered separately. The subjects taken up under the various chapters are as follows:—1, general science; 2, materials used by plumbers; 3, air and ventilation; 4, water and water supply; 5, hot water supply; 6, heating by hot water; 7, sanitary appliances and sanitary science; 8, house drainage and sanitation; 9, drain testing; 10, sewage disposal; 11, roof work; 12, geometry and setting out; 13, hydraulics; 14, arithmetic and mensuration; 15, plumbers' workshop at a technical institute.

Those who are preparing for practical examinations will find especial value in the Examples of Practical Tests given at the end of the book. Copies may be obtained from Mr. John Harrison, Brittania Printing Works, Stockton-on-Tees, England.

Messers. Pratt & Ross, Winnipeg

The firm of Pratt & Ross, architects, structural and civil engineers, Winnipeg, was formed in 1906. They have made a specialty of reinforced concrete and structural steel buildings, mill buildings and power houes, as well as acting in the capacity of consulting engineers to the Winnipeg Electric Railway Company.

Mr. Ralph Benjamin Pratt, F.R.A.I.C., was born at London, Eng., on August 9th, 1872, and was educated at the Kensington School of Art. In 1891 he came to Canada, and the following year went to Manitoba, where he was employed as an architectural draughtsman with several private firms. From 1895 to 1901, he was an architectural and engineering draughtsman for the Canadian Pacific Railway, with headquarters at Winnipeg. In [illegible] he entered the service of the Canadian Northern Railway as architect and still holds that position in addition to his connection with the firm of Pratt & Ross.

Mr. R. B. Pratt, Winnipeg

Mr. Donald Aynsley Ross, B.A., M.Can. Soc. C.E., A.R.A.I.C., was born in Winnipeg, October 5th, 1877, and was educated at Upper Canada College and the School of Practical Science, Toronto. After graduating he was engaged for two years as a mining engineer and mine superintendent in Southern British Columbia. From 1901 to 1905 he was employed as instrument man and as locating engineer for the Canadian Northern Railway in the Western Provinces. In 1905 he was appointed Terminal Engineer for the same company, a position he resigned in 1906 when entering into a partnership with Mr. Pratt. Subsequently he became Manager of Construction for the Canadian Northern Railway and Grand Trunk Pacific Union Terminals at Winnipeg. He is also Consulting Hydraulic Engineer for the Winnipeg Electric Railway Company, in conection with alterations and additions to their hydro-electric plant.

Among the more prominent works carried out by this firm may be mentioned the shops of the Canadian Northern Railway in Winnipeg; the new $400,000 Prince Edward Hotel for the C.N.R. at Brandon; 15,000 h.p. auxiliary steam turbine plant for the Winnipeg Electric Railway Company, and the ten-storey fireproof office building now in course of erection for the same company.

Mr. D. A. Ross, Winnipeg

Personal Mention

Mr. Loftus John Green, a well-known contractor, of Winnipeg, died in that city on January 19.

We regret to announce the death of Mr. Charles Pickard, founder and manager of the Sackville Freestone Company, Limited, Sackville, N.B.

Mr. J. O. Mousseau, M.P.P. for Soulanges, P.Q., has been appointed to the new provincial portfolio of Minister of Good Roads for the province of Quebec.

Messrs. Dufort & Decary, architects, Montreal, have dissolved partnership. Mr. L. J. T. Decary is carrying on his profession at the New Birks Building, Montreal.

Mr. N. J. Ker, until recently City Engineer of Ottawa, has accepted the position of Canadian Pacific engineer in charge of Shaughnessy Heights, B.C. He succeeds Mr. N. J. Carry, who resigned on account of ill-health.

Mr. Frank P. Jones, general manager of the Canada Cement Company, Limited, and president of the Canadian Venezuela Ore Company, has returned to Montreal after a visit to Venezuela.

Mr. D. W. Bellhouse, the Winnipeg architect, some of whose work is illustrated in this issue, is a native of Manchester, Eng. After studying architecture for two years at Bruges, Belgium, he entered the Royal Academy School of

Architecture at London, Eng., in 1882. There he remained for another two years, after which he came to Canada and [illegible] He then took a position in the Architectural Department of the C.P.R. in Winnipeg. He was identified with the railway company for four years, severing his connection with them to join Messrs. Stevenson & Patterson of Winnipeg, with whom he remained for one year, after which he started in private practice.

Mr. H. V. Hamilton, who was formerly with the Steel Company of Canada, is now associated with the Canada Steel Company, Hamilton, Ont., in the capacity of Sales Manager. Mr. Hamilton will also act as assistant to the manager.

Mr. H. B. Lyall, secretary-treasurer Manitoba Bridge & Iron Works, Limited, has been appointed assistant manager. Mr. Lyall was one of the original incorporators, and has been actively connected with Mr. Deacon, the president, in the affairs of the company since its inception.

Mr. G. G. Powell, of the Works Department of the city of Toronto, has been appointed Deputy City Engineer. The appointment is a popular one, Mr. Powell being held in high regard as a man of technical attainment and executive ability. He is a graduate of the School of Practical Science and has been Principal Assistant Engineer at Toronto since 1909.

Mr. G. G. Powell, who is now Deputy City Engineer of Toronto

Mr. D. F. McLeod, of Ithaca, N.Y., has been appointed City Engineer of New Glasgow, N.S. Mr. McLeod is at present Superintendent of Public Works of Ithaca and his new appointment does not become effective until his contract with the city of Ithaca expires, February 28th.

Mr. F. S. Baker, of Toronto, read an interesting paper before the Royal Institute of British Architects recently, and showed an interesting collection of slides and photos illustrating Canadian achievements. He said that in the matter of design, he believed British influence was much the strongest one affecting Canadian architecture.

Mr. J. W. Morley, of Winnipeg, president of the International Association Master House Painters and Decorators of the United States and Canada, will attend the annual convention of that body which opens at Denver, Col., on January 31st. He will return in time for the convention of the Canadian National Association of Builders at Calgary on February 18th, he being president of the latter body also.

Mainly Constructional

The News in Brief—From Coast to Coast

The annual banquet of the Montreal Builders' Exchange will be held on February 14th.

More than $12,000,000 is expected to be spent this year on civic improvements by the city of Edmonton.

It is expected that the mental hospital at Coquitlam, B.C., which is being erected at a cost of $450,000, will shortly be completed.

The annual meeting of the National Paving Brick Manufacturers' Association will be held March 3rd-5th at the Congress Hotel, Chicago.

A modern plant, much more pretentious than the one recently destroyed by fire, will be erected for the P. Burns Company at Calgary.

The ratepayers of Victoria, B.C., will shortly be called upon to vote on the question of paying $125,000 for a salt water swimming bath.

The new armory for Port Arthur, Ont., will be started in the spring and will be rushed to completion so as to be ready for occupation next winter.

The new building which will shortly be erected for the Equitable Life Assurance Society, of New York, will, it is said, be the largest structure in the world.

It is proposed to establish an Industrial Bureau in Western Canada, whose main object will be to secure industries for Manitoba, Saskatchewan and Alberta.

A special committee of the City Council of London, Ont., have decided to spend $250,000 for the purchase of property necessary for the new Federal Square scheme.

The Board of Control of the city of Toronto recently gave permission to the Royal Bank of Canada to erect a 20-storey building at the corner of King and Yonge streets.

It is not expected that a permanent waterworks engineer will be appointed at Ottawa until the management of the waterworks department is turned over to the Commission, which is yet to be chosen.

Plans are in course of preparation for a six-storey mill construction apartment house on Georgia street, Vancouver, to cost $125,000. There will be fifty-six apartments in the building.

The plans submitted by Pope & Burton, architects, Salt Lake City, for the new Alberta Mormon Temple, have been accepted and actual construction will begin early in the spring.

The city of Brandon has made a two-years' contract with the Brandon Electric Light Company to supply power for the new municipal street railway at two cents per kilowatt hour.

It is believed that natural gas for power purposes can be delivered in Calgary from Bow Island at 3 to 5 cents per thousand feet, and the city council may ask for powers to obtain it.

The site has been settled upon for the Dominion Government dock at Vancouver. It is estimated that the cost of expropriating the necessary property will be in the neighborhood of $750,000.

There are good prospects that a strong Eastern delegation will attend the convention of the Canadian National Asociation of Builders' Exchanges, which is to be held at Calgary commencing February 18th next. The Secretary of the Toronto Exchange, Mr. P. L. Fraser, has been working hard in the interests of the meeting. Special rates have been secured from Toronto as the starting point. A private car will leave Toronto on the evening of February 12th, going via Chicago and St. Paul.

The Methodist Book Room, Toronto, are considering the erection of a $1,000,000 building at the corner of Queen and John streets. Work will be commenced as early as possible this spring.

A portion of the plans for the improvement of the harbor of Quebec have been adopted so that the work can be started next spring. It is intended to expend $3,000,000 on the harbor next summer.

An eight-storey office building is to be erected at Victoria at a cost of from $250,000 to $300,000. Work will be started almost immediately. The German-Canadian Trust Company are the owners.

The Board of Trade of the city of Toronto, at a recent meeting, strongly condemned the city council for so fre-meeting, strongly condemned the city council for so fre-buildings in Toronto to ten storeys.

Plans are under way for a large departmental store at Brandon, Man., to be 100 feet by 120 feet and nine or ten storeys high, and fitted with every possible modern device for saving labor and economizing space.

The German-Canadian Trust Company, Limited, will shortly erect a new home on Douglas street, Victoria, at a cost of $100,000. The front will be of tile and brick and the rest of the building of concrete construction.

An electrical engineer will be engaged by the city of Calgary for the purpose of making a report on the matter of increasing the city's supply of power. A waterworks engineer will also be engaged to take charge of the local system.

Galt, Ont., has an extensive municipal programme for 1913. This includes the putting into effect of a garbage system, the establishment of a fire alarm system and addition to apparatus, the building of good roads and construction of a trunk sewer.

Building will shortly commence on an apartment house to cost $145,000 and to stand four storeys in height, on Howe street, Vancouver. The structure will be mill construction faced with pressed brick trimmed with stone. It will stand on a lot 85 feet by 120 feet.

The members of the Advisory Industrial Committee of the Board of Education, Toronto, have decided to modify the specifications for the building of the new Technical School and to invite new tenders from the contractors who tendered on the original specifications.

The Albion Trust Company, Limited, has purchased two lots, 100 x 114 feet, at the southwest corner of Government street and Wharf street, and will erect thereon the finest and largest office building in Victoria at a total cost, including that of the site, of more than $1,000,000.

It has been decided by the English shipbuilding firm of Swan, Hunter, Wigham and Richardson to tender for a shipbuilding plant in the event of the Federal Government resolving to build a Canadian navy. The firm have already purchased land in Montreal, Quebec and Halifax for shipyards.

The Milton Pressed Brick Company, Limited, are now located at their new offices and showrooms at 50 Adelaide street West, Toronto. Artistic designs in brick have been carried out around the walls and builders calling there will have every opportunity of examining the class of product they desire to purchase.

To stimulate better houses and town planning, Dr. C. A. Hodgetts, medical officer for the Conservation Committee, advised at the fourth annual meeting of that body, which opened at Ottawa recently, that a national housing and town-planning congress be held in Ottawa as soon as possible. He suggested that it would be a good thing to secure the attendance of one of more of the officers of the Local Government Board of Great Britain.

Mr. Albion J. Matthews and associates have formed a company under the name of The Alberta Concrete Products Company. It is the intention of the company to put up a structure 50 by 125 feet in size, and equip it with the most modern machinery for the purpose of manufacturing a general line of concrete building materials.

Under a re-organization scheme, the name of the Missisquoi Marble Company, Limited, Montreal, has been changed to Missisquoi Marbles, Limited, with a capital of one million dollars. The new company takes over all liabilities, additional capital having been secured. Orders have been booked for some time ahead.

In connection with the question of reciprocal demurrage, now being considered by the Dominion Railway Board, the Toronto Board of Trade and the Canadian Manufacturers' Association, are sending out inquiry forms all over the province, with a view to finding out the effect of the recent demurrage charges imposed.

Messrs. Marchand & Haskell, architects, of Montreal, have received instructions from the Board of Control to prepare plans for alterations to the Montreal City Hall, at an estimated cost of $100,000. The chief alterations will be to the main entrance and to the interior stairways, in order to make the entrance on the ground floor instead of the first floor as at present.

The York County Highway Board, at a recent meeting, decided to extend the good roads system on the Lake Shore Road to the borders of Peel County, at a cost of approximately $52,000. This is the first active step in the proposed Toronto-Hamilton permanent good roads system which is to be carried out at an estimated cost of $600,000.

Mr. Ed. White, the British expert engaged by Premier Borden to report on the layout of new government buildings on Wellington street, Ottawa, has suggested a double line of buildings grouped together and surmounted by a great central tower, a broad boulevard between them widening into a grand plaza or square in the centre. These suggestions are now under consideration by the government.

A large deposit of brick and pottery clay has been located at Fort Fraser, B.C., and negotiations are already under way to build a large plant for the manufacture of all kinds of brick for building purposes, and also tiling, drain pipe and pottery. There is a good demand for all of these products throughout the district, and the clay deposits just discovered would furnish the base of a profitable industry.

The new public market of Maisonneuve, P.Q., will be a large building, 80 feet in width by 200 feet in length, three storeys high, with a basement, and a central dome, 125 feet high. The building will be constructed in French style, with a Doric portico. The foundations will be of reinforced concrete, the basis in granite, and the entrance in stone. The roof will be in Spanish tiles, and the ground floor tiles, with marble walls.

The Good Roads Association formed a new [illegible] meeting held recently. It will be called the Good Roads Educational Association of Ontario, and will have for its aim the betterment of the roads throughout the province. The Provisional Committee are: Chairman, F. Roden, of the C. M. A.; treasurer, George Henry, of Ontario Good Roads Association; Major Kennedy, president of Good Roads Association; W. G. Trethewey, of the Board of Trade; and secretary, F. G. McAlister.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Dover Twp., Ont.

Drainage [illegible] cost $20,000. Tenders received by Twp. Clerk, John Welsh, Chatham, Ont., until January 31. Work includes installing and finishing a pumping plant and erection of 6 wooden bridges. Engineer in charge, D. D. McGeorge, Chatham. Peter Crawford, Commissioner.

Galt, Ont.

Waterworks system (exten.)—Town Council will shortly consider recommendations made by Supt. Bartleman and have estimates prepared. Clerk, Jos. McCartney.

Hagersville, Ont.

Cement walks contemplated by Town Council. Clerk, J. F. Park. Plans will be prepared shortly.

Kerrobert, Sask.

Waterwork and sewerage system is planned by Town Council. Clerk, O. H. Anderson. Work will be completed this year.

London, Ont.

Cement walks contemplated by City Council. Mayor, C. M. R. Graham. Engineer, W. H. Brazier. Plans will be prepared shortly.

Paving (Ridout street) planned by the Council. Mayor, C. M. R. Graham. Chairman Board of Works, Alderman Bennett. City Engineer, W. H. Brazier. Estimates are being prepared by engineer.

Macklin, Sask.

The town council is considering the erection of water and sewerage system this year. Sec.-Treas., Robert Orr.

Stratford, Ont.

Trunk sewer, cost $28,000. Clerk, R. R. Lang; City Engineer, A. B. Manson; Chairman Board of Works, Henry Pauli. Vitrified tile construction. Plans drawn.

Sarnia, Ont.

Waterworks and intake; cost $240,000. Port Edward. Chairman Fire and Water Commission, Dr. W. A. Henderson. Town Engineer, H. A. McLean, Town Hall. Consulting Engineer, Willis Chipman, Mail Building, Toronto. Filter gallery to consist of power plant, pipe line and reservoir. Plans in progress.

CONTRACTS AWARDED

Burnaby, B.C.

Paving, cost $334,000. Comptroller, W. Griffiths, Edmonds, B.C. General contractor, The Canadian Mineral Rubber Company, Limited, 18 Hastings street West, Vancouver. Grading and paving Kingsway, a 40-foot road, from Edmonds to 10 avenue, and a 30-foot roadway from Edmonds to the boundary road at Central Park, approximately 4½ miles.

Winnipeg, Man.

Sewers. Contract was awarded to J. W. Astley, engineer of construction, city yards, for sewers in Strathcona, Sylvia, Lansdowne and Boyd street. To Dominion Constructing Company, 290 Selkick avenue, for sewers in Digby and Wentworth streets. Owner, Board of Control. Secretary, Mr. Peterson. Engineer, H. N. Ruttan, 223 James ave.

Railroads, Bridges and Wharves

Co. Bagot, Que.

G. T. Ry. Co. has been authorized to construct bridge No. 138 at mileage 238.-02 Second District Eastern Division Co. Bagot, Que.

Beachburg, Ont.

C. N. O. Ry. C. has been directed to construct an undercrossing for Jno. A. Brown, Beachburg, Ont. on S. ½ lot 13 and part of N. half lot 12, con 3 E.M.L. twp., Westmeath.

Twp Darlington, Ont.

C. P. Ry. Co.'s proposed location of station on Lot 34 Con. 10, Twp Darlington, Co. Durham, Ont., at mileage 58.17 on its Toronto Sub-division.

Hamilton, Ont.

Extension in east end planned by Hamilton St. Ry Co. Engr. in charge, E. P. Coleman, Terminal Station. Five or six miles extensions, work to start in spring, new cars will be required later.

Twp. Humberstone, Ont.

G. T. Ry. Co. have been directed to construct culverts under its railway on Lots 22 and 23 Con., Twp Humberstone, suitable for properly draining the farm lands, lying to the north of railway and to carry water from the drains being constructed by the Township.

Twp. of James, Ont.

C. N. O. Ry. Co.'s location of railway through Twp. of James, Dist. Nipissing, Ont., mileage 277.9 to 281.2 from Ottawa, has been approved.

Kootenay District, B.C.

Railroad (main line). C. P. Ry Co.'s location of line from mileage 27.051 from Junction with B.C. Southern Ry. at a point in lot 8107 to a point in lot 129 at mileage 32.89, Kootenay aist., B.C.

Maberley, Ont.

C. L. O. & W. (C. P. R.) Company have been authorized to construct bridge No. 11.4 over Mud Lake, near Maberley.

New Hazelton, B.C.

G. T. P. Ry. Co.'s location of station at New Hazelton, mileage 181, Prince Rupert East, in lot 882 Group (1) Cassiar Dist., B.C., has been approved. Work to be completed within 60 days.

Ottawa, Ont.

G. T. Ry. Co. has been authorized to construct siding with spur therefrom for the Ottawa Gas. Co.

Parry Sound, Ont.

C. N. O. Ry. Co. has been authorized to extend spur to the Canada Chemical Co.'s Smelter, and to the iron and ore bins and charcoal plant of the Standard Iron & Lumber Co. of Canada, Ltd.

Townships of Pedley & Springer, Ont.

C. N. O. Ry. Co. has been authorized to construct a bridge across Sturgeon River (east crossing) Twps of Pedley & Springer, Dist. of Nipissing, Ont., mileage 249.9 from Ottawa.

Twp. of Pentland, Ont.

C. N. O. Ry Co. has been authorized to construct bridge across Amable du Fond River, Twp. of Pentland at mileage 188.1 from Ottawa, Ont.

Pointe Aux Trembles, Que.

C. N. O. Ry. Co. has been authorized to construct siding to the Canada Cement Co.'s Plant No. 1, and to cross with siding the tracks of Montreal Terminal Ry. Co.

Regina, Sask.

Track and trolley material. Mayor, R. Martin, Commrs., G. A. Mantle, L. A. Thornton. Contract D., 1,100 long tons street railway steel 7 ins., Tee rails, Lorain section 80/335. 1550 prs. 6-hole 26-in. splice bars for Lorain rail sec. 80/335. 1040 long tons street railway, Tee rails, 60 lb. A.S.C.E. section. 2000 prs. 4-hole 24-in. angle bars for 60 lb. A.S.C.E. steel rails, 10000 track bolts and nuts, 3½-in. by 1-in. oval heads, hexagon nuts, 9000 track bolts and nuts, 3⅜-in. by ¾-in. oval heads, hexagon nuts, 10000 split lock nut washers for 1-in. track bolts, 10000 split lock nut washers for ⅜-in. track bolts, 660 kegs (each keg 200 lbs.) standard railroad spikes, 5½-in. by 9-16-in. Contract E., 5400 4/0 standard copper rail bonds, 10⅛-in. C.C. 3600 4/0 standard copper rail bonds, 13-in. C.C. 630 4/0 solid copper rail bonds, 62-in. C.C. 60 4/0 solid copper rail bonds, 72-in. C.C. Contract F., 10000 standard sawn square B.C. fir railroad ties, 6-in. by 8-in. by 7-ft. 35000 standard sawn square B.C. fir railroad ties, 6-in. by 8-in. by 8-ft. 1250 Western cedar poles, 30-ft. long, 7-in. top. Contract G., 20000 barrels Portland cement. Contract H., 21 miles 2/0 hard drawn trolley wire, 12 miles 4/0 D.B.W.P. 19 stranded copper wire, 4 miles 2/0 D.B.W.P. 7 stranded copper wire, 10 miles ⅜-in. stranded soft drawn iron wire. Contract J., Insulators, Hangers, Brackets, Pullovers, Turnbuckles, Trolley Frogs, Crossovers, Clinch Ears, Pole Line Hardware, etc., etc. All material to be delivered f.o.b. Regina, freight and duty paid. Spec. delivery dates, etc., on application to H. Doughty, Supt. Municipal Ry., Regina. Tenders received by City Commrs., February 24, 1913.

Branch railway. C. P. Ry. Co.'s location of its Touchwood Hills Branch, from a point in Sec. 15-29-14 W.2.M. at mileage 43.15 to a point in Sec. 34-29-22 W.2.M. at mileage 91.90 (zero of mileage at Theodore in Sec. 15-28-7 W.2.M.) has been approved and authorized.

St. Catharines, Ont.

G. T. Ry. Co. has been authorized to construct two sidings for the Canadian Crocker-Wheeler Co., Ltd.

Provinces of Sask. and Alta.

Railroad construction planned by C. P. Ry.. Tenders have been received and contracts will be awarded shortly for 170 miles railway construction Weyburn-Lethbridge line to be completed this year, 125 miles railway construction, extension of Swift Current-Bassano line, 80 miles railway construction Lacombe Outlook branch running from Moose Jaw, 25 miles Weyburn-Lethbridge line, 30 miles Shepherd-Sletchen line.

Dist. of Sudbury, Ont.

Railroad. C. N. O. Ry. Co.'s revised location through unsurveyed territory in Dist. of Sudbury, Ont., mileage 250.37 to mileage 254.3 from Sudbury Jct. has been approved.

Tillsonburg, Ont.

Station. Cost $6,000, for C. P. R. (head office, Montreal). Arch., Engineer Tapley, London. 1½-storeys, 45 by 25. Plans in progress.

Toronto, Ont.

G. T. Ry. Co. has been authorized to construct siding for the Cement Products, Ltd.

CONTRACTS AWARDED

Windsor, Ont.

Docks, cost $75,000. Dom. Gov. Dept. of Pub. Wks. Secretary, R. C. Desrochers, Ottawa. G.C., A. E. Ponsford, 605 Talbot street, St. Thomas. Work to tart as early as possible in spring.

Public Building, Churches, Schools, etc.

Burnaby, B.C.

School buildings, Vancouver Heights, cost $75,850. Planned by Municipal Council. Clerk, Arthur G. Moore. New modern 8 room building, $40,000. New buildings and additions to existing buildings, $29,400. Clearing and improving grounds and fences, $6,450. By-laws will be submitted.

Dundas, Ont.

Post office and customs fittings, Dom Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by secretary until February 10th. Specifications at office of James Smith, Clerk of Works, Dundas; T. A. Hastings, Clerk of Works, Postal Station "F," Yonge St., Toronto, at Department, Ottawa, and MacLean Daily Reports, Toronto.

Fort Frances, Ont.

Alterations, etc., to boarding school. Tenders received by Dom. Gov. Dept. of Indian Affairs. Secretary, J. D. McLean, Ottawa, until Feb. 24th. Plans and spec. at Indian Office, Winnipeg office of Indian Agent, Port Arthur, Ont., Agent of Dominion Lands, Brandon and Post Office, Portage la Prairie.

Goderich, Ont.

Extension Sunday school, cost $3,000, for St. George's English church. Arch, J. A. Fowler is preparing plans.

Addition to Collegiate Institute, cost $7,000. Arch., J. A. Fowler is preparing plans.

Guelph, Ont.

Extension of Fair Buildings, for Guelph and South Wellington Fair Soc. Pres., Geo. J. Thorp, Woolwich street. Sec., James Laidlaw, Harrison avenue. Further information from Pres. or Sec. Plans in progress.

Hamilton, Ont.

Theatre, cost $50,000, James street., for Griffin Amusement Co., 8 Queen street East, Toronto. Arch., Bovell & Molesworth, 449 Yonge street, Toronto. Supt. of Bldgs., B. F. Richardson, 60 Market street. Steel work., D. C. McIlroy, Lottridge street. Tenders received by architects until Jan. 30th. Plans at office of Supt. 136 by 50 brick and steel construction.

It has been decided to raise $300,000 for new east and central Y.M.C.A. buildings. Pres., J. J. Greene, Sanford Mfg. Co., 90 King street. Sec., T. F. Best, 138 Jackson street, W.

Little Pines Reserve and Red Pheasants Reserve, Sask.

School buildings, planned by Dom. Govt. Dept. of Indian Affairs. Assist. Deputy and Sec., J. D. McLean, Ottawa, Ont. Plans, spec., etc., at offices of Indian Agent at Battleford, and W. J. Chisholm, Inspector of Indian Agencies, Prince Albert, Sask., and Indian office, Winnipeg. Tenders will be received by secretary for the two buildings on each reserve complete until Feb. 27th, 1913.

London, Ont.

Salvation Army Barracks, cost $10,000. (Major Frank Morris). White brick construction. Plans in progress.

College, cost $250,000, Seminary, Home and Boys College, $100,000. Sunshine Park, for R.C. Diocese of London, Bishop Fallon. College for Redemptorist Fathers. Sites have been purchased. Further information from Bishop. Brick, orn. stn., cement and steel construction. Plans in progress.

Montreal, Que.

Fire and police station, cost $50,000, Notre Dame. Planned by city council. Sec., L. N. Senecal. Arch., Alphonse Piche, 52 Victoria square. Tenders will be received by secretary after Jan. 20th. Plans at office of secretary, City Hall. 2-storeys, 120 by 70, stone and brick construction.

Morden, Man.

Public building. Tenders received by Sec. Dom. Govt. Dept. of Public Works, R. C. Desrochers, Ottawa, until Monday, Feb. 10th, spec., etc., at office of H. E. Matthews, Supt. Arch. of Dom. Pub. Bldgs., in Province of Manitoba, Winnipeg, Man., Post Office, Morden, Man., Dept. Ottawa and MacLean Daily Reports, Toronto.

Nanaimo, B.C.

Theatre and amusement [illegible] Victoria crescent and Cavan street, for The Nanaimo Amusement Co. Arch., Allan Stroud Co., Ltd., 325 How street, Vancouver, B.C. [illegible] To be modern in every detail. Foundations in.

North Oyster, B.C.

School. Provincial Government, Department of Public Works. Engineer, J. E. Griffith, Victoria. Plans, specifications, etc., at Department, Victoria, and Government Agent Thompson, Nanaimo, for school at North Oyster in the Newcastle Electoral District. Tenders received by Minister, Hon. Thos. Taylor, Victoria, until February 4, 1913.

Oshawa, Ont.

Surgical wing for hospital, cost $10,000, will be built. Mr. Geo. Pedlar, Oshawa, has donated the above amount. Work to start as soon as plans have been prepared.

Port Perry, Ont.

Post office fittings. Tenders received by Secretary, Dom. Govt. Dept. of Public Works, R. C. Desrochers, Ottawa until Monday, Feb. 3rd, spec., etc., at office of W. G. Parrish, Clerk of Works, Port Perry, T. A. Hastings, Clerk of Works, Postal Station F, Yonge street, Toronto, Dept. Ottawa and MacLean Daily Reports, Toronto.

Prince Albert, Sask.

Church, cost $70,000, planned by the Trustees of the Methodist Church. Seating capacity, 1,200. Site has been purchased on 3rd avenue and 11th street. Work will begin in spring.

St. Felicien, Que.

Church, Lake St. John, for R.C. Congregation. Arch., Jos. P. Ouellet, 28 Ste. Famille street, Quebec, is preparing plans. Further information from curate of parish.

St. Hyacinthe, Que.

Re-building theatre for Arthur Flibotte, 183 Girouard, metal roofing, wood and metal covering. Plans will be prepared to restore building destroyed by fire.

South Vancouver, B.C.

Two incinerators, cost $60,000, have been recommended by the health committee. Plans will be prepared.

Sandy Bay, Man.

Alterations to boarding school. Tenders received by Dom. Govt. Dept. of Indian Affairs. Sec., J. D. McLean, Ottawa, until Feb. 24th. Plans and spec. at Indian Office, Winnipeg, office of Indian Agent, Port Arthur Ont., Agent of Dominion Lands, Brandon, and Post Office, Portage la Prairie.

Shoal Lake, Man.

Municipal hall and fire station planned by town council. Sec.-treas., Frank Hobbs. Work to start as soon as necessary funds are raised.

Uxbridge, Ont.

Post office fittings, Dom. Govt., Dept of Public Works. Sec., R. C. Desrochers, Ottawa. Tenders received by secretary until Monday, Feb. 3rd, 1913. Spec., etc., at office of John Park, Clerk of Works, Uxbridge, T. A. Hastings, Clerk of Works, Postal Station F, Yonge street, Toronto, at Dept. Ottawa and MacLean Daily Reports, Toronto.

Vancouver, B.C.

[illegible] selected Honeyman & Curtis, architects, 821 Pender street west, to prepare plans. [illegible]

[illegible]

McQueen. By-laws were passed for the following: General hospital, $425,000, [illegible] $1,000,000, [illegible] planking, etc., of roads and streets, etc., $220,000; grading roads, streets, etc., $220,000; waterworks purposes, $800,000, park improvements, $82,500; land for parks, [illegible], Vancouver Exhibition, $165,000; opening and clearing Edward 7th street, $77,000, east end viaducts, $148,500; Mount View cemetery, $16,500, land for new cemetery, $100,000, east end police station, $14,000, additional amount for new police headquarters, $70,000; public [illegible] conveniences, $55,000; home for the aged, $50,000; ferry subway, $47,300.

Schools, planned by Board of Education. Sec., C. W. Murray. By-laws were passed to raise $683,000, for the work of building.

Creche building, planned by city council. Clerk, Wm. McQueen. By-law was passed to raise $70,000 for the work.

Victoria, B.C.

Normal school, cost $200,000. Provincial Government, Dept. of Public Works. Minister, Hon. Thos. Taylor. Architect, W. C. F. Gillam, 509 Richards street, is preparing plans. Two storeys and basement, gymnasium, manual training and domestic science rooms, library, music room with soundproof walls and auditorium. Tenders will be called.

Winnipeg, Man.

Public bath houses. The Public Baths Committee has decided to make request to Government for power to have by-law submitted for $125,000 to erect public bath houses this spring on sites not yet chosen. Board of Control. Sec., M. Peterson.

CONTRACTS AWARDED

Gilley, B.C.

School, cost $7,800, Burnaby district. Arch., J. H. Bowman, 615 Pender street West. G.C., Jno. Anderson, Box 233 McKay P.O., B.C. 4-room, frame construction.

Lethbridge, Alta.

Church, cost $100,000, planned by the Trustees of the Wesleyan Methodist Church. Arch., H. U. Wheddington. G.C.'s, Smith Bros. and Wilson. Heating and roofing, Davidson Metal Co. Electrical work, McKenzie & Co. Contract for interior fittings not let yet. 1-storey 125 by 125, cement foundation, fancy brick and structural steel construction.

Port Dalhousie, Ont.

School, alterations and additions, cost $100,000. Arch., A. E. Nicholson, St. Catharines. Excavation and masonry, J. Nichols, St. Catharines. Carpenter, R. Blank, St. Catherines. Painting and glazing, A. Riddell & Son, 283 St. Paul street, St. Catharines. Two storeys, 6 rooms, stone foundation, brick construction.

Saskatoon, Sask.

Church, cost $4,900, 1st ave. and 16th street, for St. Georges Church Congregation. Pastor, Rev. H. Assiter. General contractor, B. Gurnet.

St. Catharines, Ont.

Fire hall, cost $10,000, Lake street, Mayor, Dr. W. Merritt. Engr., W. D. Scott. Arch., A. E. Nicholson, 46 Queen street. Excavating and masonry, Rymers Bros. Carp., Lincoln Construction Co., Ltd., Niagara street. Painting and glazing, Leach & Jones, 46 James street. Plumbing, Andrew Riddell & Son, 283 St. Paul street. Heating, John Peart, 49 King street. Stone work, Octave Lachanse. Roofing, David Pierce. Wiring, Martin Elec. Supply Co., 9 Paul street. 2-storeys, 30 by 65, stone foundation, stone and brick construction.

Business Buildings and Industrial Plants

Blenheim, Ont.

Canning factory, cost $40,000, Talbot street, planned for the British Canadian Canners, Ltd. Manager, John Wall, 34 James street, N. Hamilton. Local manager, G. W. Muckle. Site has been purchased and work will start as soon as possible.

Chatham, Ont.

Auto wheel factory, cost $40,000, planned for Chatham Auto Wheel Company. By-law will be voted on regarding company locating in city. Will require machinery, etc.

Chapleau, Ont.

General store, additional cost $3,000, for V. T. Chapple. Arch., Angus and Angus, North Bay, Ont. Tenders received by owner after Feb. 1st. 2-storeys and basement, 25 by 70, frame construction, stone foundation.

Dauphin, Man.

Stores, cost $18,000, for McDonald & Voigt. 2-storeys, 92 by 44. Tenders received by owners. Full particulars from arch., H. Bossom.

Fort William, Ont.

Extension to elevator, planned for Western Terminal Elevator Co. Capacity to be increased by 1,000,000 bushels. Work to start as soon as possible.

Steel plant, planned for the Steel Co. of Can., Ltd., 1272 Notre Dame East, Montreal. Arch., Prack & Perrine, 38 James street South, Hamilton. Fireproof construction.

Galt, Ont.

Creamery contemplated for S. L. Clark, Oak street. Architect not yet chosen. To be erected in spring. Brick or cement construction, concrete and tile floors.

Hamilton, Ont.

Office, cost $3,500, York street, for Hamilton Cemetery Board, City Hall. Sec., F. J. Rutherford. Archs., Stewart & Witton, 2 Hughson street, South. Tenders will be called in about two weeks. 1-storey, 48 by 38, stone foundation, Abbe cut stone construction.

Factory, remodelling, cost $5,000, Merrick street, contemplated for W. J. Peppiatt, Bank of Hamilton Building. Architect not yet chosen.

Foundry plant, cost $250,000, planned for Hamilton Malleable Iron Co., Ltd. Manager, J. E. Hammond, Sun Life Building. Archs., Prack and Perrine, 36 James street South. Main building, 600 by 200, will contain 15-ton melting furnaces, annealing furnaces, complete cleaning and finishing equipment, high speed electric traveling cranes. Other buildings include machine shop, carpenter and pattern shop, storehouse, pattern storage vault and office, will require runway cranes, compressed air moulding machines, sand blast equipment, etc.

Lethbridge, Alta.

Frache Bros. will erect two large greenhouses here in the spring. Plans are being prepared.

Montreal, Que.

Office building, cost $200,000, St. James street, for Jos. Versailles, Banque Nationale Bldg. Tenders received by architects, Ross & MacDonald, 1 Belmont street, until January 31st. Ten storeys, cement foundation, frame, terra cotta, steel, fireproof and reinforced concrete construction.

Bank building, La Salle and Ontario street, Maisonneuve, for Bank of Hochelaga, building to be erected in spring. Plans in progress.

Maisonneuve, Montreal, Que.

Shoe factory contemplated for the Smarton Shoe Co. of Quebec, 245 by 230. Plans will be prepared.

North Bay, Ont.

Warehouse, cost $12,000, Oak street, for Canadian Consolidated Rubber Co., Notre Dame East and Papineau street, Montreal, Que. Tenders received by Archs., Angus & Angus, from Feb. 15th to 28th. 2-storeys and basement, 40 by 90, concrete, brick and frame construction, concrete foundation.

Ottawa, Ont.

Storeroom, cost $6,000, for McAuliff-Davis Lumber Co., Duke street. 99 by 99, cement foundation, solid brick construction. Plans in progress.

Regina, Sask.

Customs warehouse, cost $250,000, contemplated by Dom. Govt. Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Plans will be prepared, and building erected this year.

St. John, N.B.

Sugar refinery, cost $1,000,000, Ballast Wharf, planned for Atlantic Sugar Refinery Co., D. Lorne McGibbon, 20 Ontario avenue, Montreal. 7 buildings, pan house, 9-storeys, 72 ft. 8 ins. by 137 ft. 8 ins., filter house, 9-storeys, 96 ft. 2 ins. by 75 ft. 8 ins., machine shop, 3-storeys, 50 ft. by 82 ft. 8 ins., engine and pump house, 1-storey, 41 ft. 6 ins. by 75 ft. 8 ins., boiler house, 2-storeys, 82 ft. 8 ins. by 102 ft. 8 ins., melter house, 4-storeys, 62 ft. 8 ins. by 42 ft. 8 ins., warehouse, 4-storeys, 140 by 80. Supt. of Construction, Jos. F. Stillman.

Sarnia, Ont.

Extension stove factory, Wellington and Vidal streets, for Doherty Mfg. Co., 157 Vidal street South. Manager, W. Doherty. Arch., R. W. Fawcett, 142 Essex street. 3-storeys, 100 by 40, white brick construction, stone foundation. Plans prepared.

Sudbury, Ont.

Hotel, cost $25,000, additions and alterations, Elm street, for D. M. Moren, Sudbury. Arch., Angus & Angus, North Bay. 3-storeys and basement, 40 by 80, brick and frame construction, stone foundation. Plans in progress.

Tavistock, Ont.

Felt boot factory, cost $15,000, planned for Senator Valentine Ratz. Arch., not yet chosen. General shoe machinery required. 2-storeys, 60 by 75, white brick construction.

Toronto, Ont.

Three attractive stores and residences, cost $7,000, Danforth avenue, for J. A. Thompson, 258 Beatrice street. Arch.,

S. A. Waggett, 61 Bleeker street. 2-storeys, 48 by 52, brick construction, cement and brick foundation. Plans drawn.

Store and office, cost $6,000, for A. E. Playter, Playter crescent. Arch., F. Wilkins, 56 Globe avenue. 3-storeys, 30 by 65, brick construction and foundation, structural steel beams. Plans drawn.

Vancouver, B.C.

Stores and apartments, cost $70,000, Carroll street and Market Alley, for Wing Sang & Co., 13 17th avenue East. 8-storeys, brick construction. Plans, spec. at office of architect, who also receives tenders.

Winnipeg, Man.

Storage warehouse, Gomery street, planned for Gaults, Ltd., Bannatyne and Arthur streets. 5-storeys and basement. To be erected this spring.

Office building, Smith street, for H. E. R. Rogers, c/o Hislop, Ltd., 262 Portage avenue. 4-storeys, 54 ft. frontage. Plans in progress. Buildings at present on site to be demolished about March 1st.

CONTRACTS AWARDED

Berlin, Ont.

Three stores, for Leo. Longo, 114 King East. Arch. and bldr., C. Cowan, 200 Victoria street. 2-storeys, 80 by 60, store fixtures and fronts.

Burlington, Ont.

Size factory, for Vera Chemical Co. Supt., D. C. Davis. Arch., Gladman & Gladman, Confed. Life Bldg., Toronto. G.C., Jago & Harris, Confed. Life Bldg., Toronto. 4-storeys, 152 by 62, white brick construction, boilers, engines, 70 ft. brick stacks, belting.

Fredericton, N.B.

Rebuilding Lumber Mills, cost $50,000, Victoria Siding, for Fraser, Limited. Mech. engr., W. L. Montague, Brantford, Ont. G.C., Waterous Engine Works, Brantford, Ont. Bldr., Moses Mitchell. Millwright, Mr. Paget, Victoria Siding. 3-storeys, 160 by 40, cement foundation, brick construction, galvanized iron roofing, metal lath. The following supplies will be required, dry kiln, electric light and fire equip-equipment, planing mill machinery, belting, extensive piping connections, pipe covering (asbestos or mineral wool), metal lathe and drill press, sprinkler system.

Fort William, Ont.

Alterations to Manitoba Hotel, cost $12,000, Simpson street, planned by I. Mack, owner. Alterations include steam heating plant, bar fixtures, plumbing, metal ceilings and walls, new plate glass fronts, windows and doors. Work being done by day labor.

Montreal, Que.

Additions and Alterations to bag factory, Mullins, for the Smart-Woods Co., Ltd., 800 Mullins street. Arch., Ross & MacDonald, 1 Belmont street. G.C.'s, James Shearer & Co., 225 St. Patrick street. 3-storeys, reinforced concrete, solid brick and mill construction. Sub. tenders called.

New Westminster, B.C.

Printing office and stores, cost $53,800, for the Columbian Co., Ltd. Man.-Dir., J. D. Taylor, 3rd avenue. Archs., Gardiner & Mercer, Westminster Trust Bldg. G.C.'s, Adkinson & Dill, 319 Howe street, Vancouver. 2-storeys and basement, 50 by 132, re-concrete and steel construction, concrete foundation.

Ottawa, Ont.

Stores and offices, cost $600,000, for Blackburn Bros., Sparks street. Architect and general contractor, W. E. Noffke, Central Chambers. Iron and steel, Dominion Bridge Co., Carleton Cham-

Regina, Sask.

Warehouse, cost $215,000, for the John Deere Plow Co., Albert and S. Railway street. G.C., Carter-Halls-Aldinger Co., Ltd., 1010 Union Bank Bldg., Winnipeg, Man. 6-storeys, 120 by 120, re-concrete construction, steam heating, electric lighting.

Walkerville, Ont.

Garage and factory, cost $19,000, Kildare road, for George Reid. Arch., Leybourne & Whitney, Davis Blk., Sandwich street E. G.C., H. Howe, Cataraqui and Devenshire streets. Freight elevator, H. Kissane. Heating and plumbing, owner. 3-storeys, 119 ft. 3 ins. by 50 ft, brick, stone, concrete and steel construction.

Bank building, Wyandotte road, for Merchants Bank of Canada. Arch., Hogle & Davis, 80 St. Francis Xavier street, Montreal. G. C.'s, Frost Winchester Co., Curry Hall, Windsor. 2-storeys, 50 by 50, brick and terra cotta construction. Foundations in.

Winnipeg, Man.

Hotel, cost $100,000, Notre Dame and Albert street. Owner, Geo. Skinner, prop. Grange Hotel, 168 Lombard street. Archs. and G.C.'s, Carter-Halls-Aldinger & Co., Union Bank Bldg. 3-storeys and basement, 75 bed rooms, ice plant, etc. To be called St. Charles Hotel.

Residences

East London, Ont.

Residences. Owner and builder, A. Switzer, Pottersburg, London. To be built in spring. Brick and frame construction, cement foundation.

Fredericton, Ont.

Two residences, cost $5,000, York st., for Hamilton Kitchen, stone foundation, frame construction. Plans in progress.

Goderich, Ont.

Alterations to residence, cost $4,000, for Rev. Jonas Bateman. Arch., J. A. Fowler, is preparing plans.

Hamilton, Ont.

Residence, cost [illegible] [illegible] for Victorian Order of Nurses, 36 Hess street South. Interested, Geo. Hope, 43 Duke street. Plans will be prepared.

Residence, cost $9,000, Mountain Top, for H. V. Young. Tenders received by Arch., Stewart McPhie, Bank of Hamilton, concrete tile, fireproof.

Residences, cost $8,000, Mountain Top, planned for Clifford & Whitman, Mountain Top. The purchaser will build in spring.

Ottawa, Ont.

Residence, cost $4,000, Flora street, for C. W. McCallum, 628 Gladstone ave. 22 by 40, stone foundation, brick veneer construction, felt and gravel roofing. Plans in progress.

Oxford Mills, Ont.

Parsonage planned by Methodist Church Trustees. Tenders received until Feb. 1st, plans and spec. at parsonage, brick construction.

Toronto, Ont.

Residence, cost $4,000, for Jos. Black, 311 Kent Bldg. Architects, Redmond & Beggs, 311 Kent Bldg. 2½ storeys, 26 x 49, brick construction, stone foundation. Plans drawn.

Residence, cost $8,000, N. Markham, for L. J. Blaud, 18 Vermont ave. 2½ storeys, 24 x 48, brick construction and foundation. Plans drawn.

Residence, cost $3,000, Medland, for John Young, 43 Dundas street. 2½ stys. 22 x 34, brick construction, stone foundation. Plans drawn.

Residence, cost $3,500, Indian Rd., for E. Blaise, 891 Manning avenue. 2½-storeys, 22 by 44, cement foundation, brick construction. Plans drawn.

1 pair residences, cost $8,000, King & Beatty, for S. King, 185 Spadina avenue. Arch., H. Simpson, 82 King street East. 2-storeys, 46 by 62, brick foundation and construction, felt and gravel. Plans drawn.

1 pair residences cost $6,000, College, for H. Herman, 556 Adelaide street W. Arch., J. Hunt Stanford, Bloor and Ossington. 3-storeys, 42 by 56, brick construction and foundation. Plans drawn.

Vancouver, B.C.

Residence, cost $12,000, Shaughnessy Heights, for E. B. McDermid, 470 Granville street. Arch., G. B. Kaufman, 43 Davis Chambers. 2-storeys and basement, stone and frame construction. To be modernly equipped. Tenders received by architect.

Apartments, cost $100,000, Georgia street, for T. Scott. Tenders received by architect, Emil Guenther, North West Trust Bldg. 6-storeys, 66 by 132, brick and mill construction, terra cotta, marble and tile.

Walkerville, Ont.

Apartment house, cost $25,000, Victoria road and Sandwich street, for Chas. Chilver, 4 Victoria road. Plans in progress.

Waterloo, Ont.

24 residences, cost $52,800, King St., for Charles Fisher. Arch., Ornan C. Scheilfele, King street. 2-storey, 26 by 30. Plans drawn.

CONTRACTS AWARDED

Hamilton, Ont.

Residence, cost $[illegible], [illegible] ave. Owner and builder, H. Durham, 742 Cannon street E. 2½-storeys, stone foundation, brick construction.

Montreal, Que.

Residence, cost $[illegible], Papineau Ave. Owner and builder, O. Charbonneau, 828 Marechal. 2½-storeys, 26 by 36, brick stone foundation, felt and gravel roofing. Foundations in.

Residence, cost $[illegible], [illegible]. Owner and builder, Ovila Benoit, St Ferdinand. 2-storeys, 26 ft. 6 ins. by 25 ft., stone foundation, brick construction, felt and gravel roofing.

Residence, cost $[illegible], [illegible]. Owner and builder, [illegible], 2062 Cartier. 3-storeys, 25 ft. by 50 ft., stone foundation, brick construction, felt and gravel roofing.

Ottawa, Ont.

Residence, cost [illegible] [illegible]

(Continued on page [illegible])

Tenders and For Sale Department

Tenders Wanted

[illegible] will be received by the undersigned [illegible] 3rd day of February, 1913, for the erec[illegible] of the new Public Library building at Mount Forest. Tenders may be given for the whole or any parts of the work.

[illegible] not necessarily accepted. Plans and specifications may be seen at [illegible] architect, Harriston, and of the undersigned at Mount Forest.

The party whose tender is accepted will be required to furnish security for the due carrying out of the contract.

M. O. MACGREGOR,
Secretary, Public Library Board.
[illegible] 1913. 4-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope "Tenders for Valves," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following valves, F.O.B. Port Arthur:—

24-in. Gate Valves, equipped with operating gears	30
12-in. Gate Vales, without gears	9
24-in. Check Valves, with 3-in. by-pass	2

Specifications can be seen at the office of the City Engineer, Port Arthur, or the office of the Contract Record and Engineering Review, Toronto, Ont.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily ac[illegible]

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur,
December 28th, 1912. 1-5

Notice

CITY OF PORT ARTHUR

Sealed tenders, endorsed on envelope, "Tenders for Lapwelded Steel Pipe," will be received by the undersigned up to 5 o'clock p.m. of **Monday, February 3rd, 1913**, for the supply and delivery of the following Lapwelded Steel Pipe, F.O.B. Port Arthur:—

24-in. Pipe, 5/16-in. metal, Bell & Spigot joints, 40,200 lineal feet.
24-in. Pipe, 5/16-in. metal, flanged joints, 2,700 lineal feet.
24-in. Pipe, ¼-in. metal, flanged joints, 2,700 lineal feet (Alternative)
12-in. Pipe, 3/16-in. metal, Bell & Spigot joints, 6000 lineal feet.

Also specials and flexible joints for the above, as per list furnished with the specifications.

Specifications can be seen at the office of the Contract Record and Engineering Review, Toronto, or the office of the City Engineer, Port Arthur.

A marked cheque for an amount equal to five per cent. of the contract is required as a deposit.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
Corporation Offices, Port Arthur.
December 28th, 1912. 1-5

Tenders for

Laying Water Mains

Tenders addressed to Wrights Limited, 22 College Street, Toronto, will be received up to **February 10th, 1913**, for the laying of approximately 13,000 feet of water mains at Kingsdale, York Township, Yonge Street, near Lansing, to be completed on or before August 1st, 1913. Forms of tenders, specifications, etc. may be secured from Wrights Limited or James, Loudon & Hertzberg, Room 6, 57 Adelaide Street East, Toronto, Ont. 5-5

CITY OF REGINA, SASK.

Regina Municipal Railway

TENDERS

For Track, Paving, Intersections and Specials

Sealed tenders, registered, and clearly marked on the outside of the envelope "Tenders for Street Railway Pavement Track Intersections and special Work," and addressed to the City Commissioners, Regina, Sask., Canada, will be received up to noon, **Monday, the 10th day of March, 1913**, for the supply of:—

Contract K.

40,000 sq. yds. track paving with top finish and sub-base.

Contract L.

Eleven single track, three part Wyes, 60 lb. A. S. C. E. section.

Eight single track, plain curves, 60 lb. A. S. C. E. section.

Four Turnouts, guarded rail, 60 lb. A. S. C. E. section.

Various cross-overs, Diamond Turnouts and special intersections.

All track intersections and specials to be delivered F.O.B. Regina, freight and duty paid.

Copies of specifications, schedules delivery dates, and blue prints with full particulars, and form of contract can be had upon application to H. Doughty, Superintendent, The Regina Municipal Railway, Regina, Sask., Canada.

Persons tendering are notified that tenders will not be considered unless made on form provided. Forms will be mailed upon request to the Superintendent.

A marked cheque covering five per cent. (5 p.c.) of the amount of the bid (made payable to the City Treasurer) must accompany each Tender.

The City Commissioners reserve the right to reject any or all Tenders.

R. MARTIN, Mayor.
G. A. MANTLE,
L. A. THORNTON,
5-7 City Commissioners.

Sidewalk Construction

Tenders addressed to Wrights Limited, 22 College street, Toronto, will be received up to **February 10th, 1913**, for the laying of approximately 114,000 sq. feet of concrete sidewalk at Kingsdale, York Township, Yonge Street, near Lansing, to be completed on or before August 1st, 1913. Forms of tenders specifications, etc., may be secured from Wrights Limited, or James, Loudon & Hertzberg, Room 6, 57 Adelaide St. E., Toronto, Ont.

Wrights Limited reserve the right to deliver the gravel at the work at $1.75 per sq. yd. 5-5

CITY OF HAMILTON

Cast Iron Pipe and Specials for the High Level and Mountain Water-Works Systems

Tenders will be received by registered post up to 10 o'clock a.m., on **February 18th, 1913**, for the supply and delivery of:—

12-inch flanged pipe; high pressure.
12-inch bell and spigot pipe; high pressure.
12-inch, 16-inch and 24-inch special castings for high and low pressure service.

Tenders to be addressed to John Allan, Esq., Mayor, in care of S. H. Kent, City Hall, Hamilton, Ont., and be made on forms supplied by the City.

Specifications, plans and form of tender may be obtained from A. F. Macallum, City Engineer, Hamilton, Ont.

Lowest or any tender not necessarily accepted.

S. H. KENT, City Clerk.
City Hall, Hamilton, Ont.,
January 23rd, 1913. 5

Hydro-Electric Power Commission of Ontario.

Tenders for Transmission Line Material

Sealed tenders, addressed to the undersigned and endorsed "Tender for Galvanized Steel Towers, Special Crossing Towers, Copper Cable, Aluminum Cable, Insulators, Galvanized Malleable Iron Clamps, Galvanized Pressed Steel Clamps" will be received at this office until noon of **Monday, March 17th, 1913**, for the material required in construction of about 125 miles of transmission line to operate at 110,000 volts as follows:—

Galvanized Steel Towers.
Special Crossing Towers.
Copper Cable.
Aluminum Cable.
Insulators.
Galvanized Malleable Iron Clamps.
Galvanized Pressed Steel Clamps.

Plans, specifications and form of contract can be seen and form of tender obtained at this office. Tenderers will conform to the usual guarantee and provide details of address, etc.

The Commission does not bind itself to accept the lowest or any tender.

HON. ADAM BECK,
Chairman Hydro-Electric Power Commission,
709 Continental Life Bldg.,
Toronto, Ont.

Unauthorized insertions in newspapers will not be paid for.

Toronto, January 24th, 1913. 5

Tenders for Cast Iron Pipe

Tenders addressed to Wrights Limited, 22 College street, Toronto, will be received up to **February 10th, 1913**, for the supplying and delivery of Cast Iron Pipe with connection, etc., at Kingsdale, York Township Yonge Street, near Lansing. Plans, specifications and form of tender may be received from Wrights Limited, or James, Loudon & Hertzberg, Room 6, 57 Adelaide Street East, Toronto, Ont. 5-5

Tenders Wanted

Tenders, whole or separate, will be received up to **February 22nd**, for the erection and completion of a school dwelling in Milverton, before October 1st, 1913.

The lowest or any tender not necessarily accepted.

Plans and specifications may be seen at the office of the Bank of Hamilton, Milverton or the office of Architect Russel, Stratford.

MALCOLM MacBETH,
Secretary,
Milverton, Ont.

N.B.—Brick, sand, lime and iron girders are already on the premises. 5

Plans Wanted

Architects are requested to submit, free of charge therefor, to the undersigned on or before **February 17th, 1913**, plans and specifications with estimated cost for one-storey and two-storey 10-room school building with assembly room to be erected in the Town of Brampton in the County of Peel.

Dated January 17th, 1913.

T. J. BLAIN,
4-6 Sec.-Treas. Brampton Public School Board.

Sealed tenders addressed to the undersigned, and endorsed "Tender for Public Building, Aylmer, Ontario," will be received at this office until 4.00 p.m. on **Monday, February 17, 1913**, for the construction of a Public Building at the place mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the Post Office, London, Ont., at the Post Office, Aylmer, Ont., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, January 25, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—34802. 5-6

For Sale

Second-hand, one 10-in. x 16-in., 36-in. gauge, saddle tank, Porter locomotive, steam brakes. In good running order. At present stored at Montreal Locomotive Works, Montreal. Also, dipper stick for 70-ton shovel and 3-yard steam shovel bucket, both rebuilt. Fraser, Brace & Co., 1328 Broadway, New York City. 4-6

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

FOR SALE SCREENING PLANT

One Rotary Screen, 30-in. x 7-in. Perforations 1-in. to 2½-in., with extra plates for various sizes.

One Rotary Screen, 32-in. x 6-in. Perforations 1-in. to 2-in., with extra plates for various sizes.

One Double Deck Whip Ball Shaker Screen, American Road Machine make and adapted for screening coarse sand and plaster sand.

This plant is practically new. One month in use. Capacity 35 to 40 tons per hour. Our reason for selling, capacity not large enough. Excellent plant for party requiring output of 300 to 400 tons per day. Reply to National Sand & Material Company, Limited, Welland Ont. 4-6

CITY OF REGINA, SASK.

REGINA MUNICIPAL RAILWAY.

TENDERS

FOR

TRACK and TROLLEY MATERIAL

Sealed tenders registered, and clearly marked on the outside of the envelope "Tenders for the Supply of Street Railway Materials," and addressed to the City Commissioners, Regina, Sask. Canada, will be received up to noon **Monday, the 24th day of February, 1913**, for the supply of:—

CONTRACT D.

1100 long tons street railway steel 7-in. Tee rails, Lorain section 80/335.
1550 pairs 6-hole 26-in. splice bars for Lorain rail section 80/335.
1040 long tons street railway Tee rails, 60 lb. A.S.C.E. section.
2000 pairs 4-hole 24-in. angle bars for 60 lb. A.S.C.E. steel rails.
10000 track bolts and nuts, 3½ in. x 1 in., oval heads, hexagon nuts.
9000 track bolts and nuts, 3¼-in. x ¾-in., oval heads, hexagon nuts.
split lock nut washers for 1-in. track bolts.
10000 split lock nut washers for ¾-in. track bolts.
660 kegs (each keg 200 lbs.) standard railroad spikes, 5½ in. x 9/16 in.

CONTRACT E.

5400 4/0 standard copper rail bonds, 10 ⅝-in. C.C.
3600 4/0 standard copper rail bonds, 13 in. C.C.
630 4/0 solid copper rail bonds, 62 in. C.C.
60 4/0 solid copper rail bonds, 72 in. C.C.

CONTRACT F.

10000 standard sawn square B.C. fir railroad ties, 6 in. x 8-in. x 7 ft.
35000 standard sawn square B.C. fir railroad ties 6 in. x 8-in. x 8 ft.
1250 Western cedar poles, 30 ft. long, 7-in. top

CONTRACT G.

20000 barrels Portland Cement

CONTRACT H.

21 miles 2/0 hard drawn trolley wire.
12 miles 4/0 D.B.W.P. 19 stranded copper wire.
4 miles 2/0 D.B.W.P. 7 stranded copper wire.
10 miles 3/8 in. stranded soft drawn iron wire.

CONTRACT J.

Insulators, Hangers, Brackets, Pullovers, Turnbuckles, Trolley Frogs, Crossovers, Clinch Ears, Pole Line Hardware, etc., etc.

All material to be delivered F.O.B. Regina, Freight and duty PAID.

Copies of specifications, schedules, delivery dates, and form of contract, and other particulars can be had upon application to H. Doughty, Superintendent, the Regina Municipal Railway Regina, Sask., Canada.

Persons tendering are notified that tenders will not be considered unless made on forms supplied. Forms will be mailed upon request to the Superintendent.

A marked cheque covering five per cent. (5 p.c.) of the amount of the bid (made payable to the City Treasurer) must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

R. MARTIN, Mayor.
G. A. MANTLE
L. A. THORNTON,
City Commissioners.

Notice to Contractors

[illegible] y, February 4th, 1913, for the construc- [illegible]

Sewers

[illegible].

Queen Street, from Eastern Ave. to Morley Ave.;

Queen St., from Kingston Rd. to Eastern Ave. (outlet);

Kingston Road, from Queen Street to Edgewood [illegible];

Kingston Road, from Woodbine Ave. to Main Street (District A);

Main Street, from Kingston Road to Gerrard St. (District A);

Conduit Street, from Quebec Avenue to High [illegible];

Rosemount Avenue, from Oakwood Avenue to Springmount Avenue.

Envelopes containing tenders must be plainly marked on the outside as to contents.

Specifications may be seen and forms of tender obtained at the office of the Commissioner of Works, Toronto.

The tenderers shall submit with their tender the names of two sureties, or in lieu of said sureties, the bond of a Guarantee Company, approved by the City Treasurer.

The usual conditions relating to tendering as prescribed by the City By-law must be strictly complied with.

The lowest or any tender not necessarily accepted.

H. C. HOCKEN, Mayor,
Chairman, Board of Control.

[illegible]
[illegible] 1913 5

Situations Vacant

WANTED—Experienced plumbing goods salesman to travel throughout Ontario, Manitoba Saskatchewan and Alberta, to represent large American manufacturing concern. Address Box 694, Contract Record, Toronto, Ont. 3-6

[illegible] electrical salesman, experienced in selling panel boards, switchboards, meters, transformers, etc. Splendid position for good man. Apply Box 694, Contract Record, Toronto, Ont. 4-5

WANTED—By a Construction Company, a first-class superintendent. Must be accustomed to handling large buildings. A thoroughly technical and practical man required. Reply, giving experience, etc., to Box 689, Contract Record, Toronto, Ont. 4-6

Two architectural draughtsmen required by Montreal architect. State age, experience and salary required. Permanent position if suitable. Contract Record, Box K. 119 Board of Trade, Montreal. 4-6

Town Foreman Wanted

Applications will be received by the undersigned for the vacant position of Town Foreman of the Town of Galt, Ont., up to **Wednesday, the 12th day of February.** Salary $1,400

Only those capable of managing successfully large gangs of men, and having a thorough knowledge of Macadam Road-making, Cement Concrete and Sewer Construction need apply.

Applications to have endorsed on the envelope "Applicant for Town Foreman."

JOSEPH McCARTNEY,
5-6 Town Clerk, Galt, Ont.

Situations Wanted

Civil Engineer, 23, desires position as instrument man on railroad location, construction or maintenance. Four years practical experience in field; accustomed to rough country; will go any where. Alfred Holmead, 772 St. Nicholas Ave., New York. 5-6

Residences

(Continued from page 71)

Owner and builder, Emile S. Kulech, 58 Lousia street. 20 by 40, cement foundation, brick veneer construction.

Residence, cost $4,200, Hopewell St. Owner and builder, J. A. McMenemy, 18 Seneca street. 36 by 35, stone foundation, double brick veneer construction.

Tavistock, Ont.

Residence, cost $4,500. Owner and builder, H. Schlemmer. 2-storeys, brick or cement construction.

Toronto, Ont.

Residence, cost $18,000, Russell Hill Road, for A. A. Morrice, 199 Yonge St. Architects, Eden Smith & Son, 199 Yonge street. General contractor, Neil McGregor, 158 Geoffrey street. Two and a half storeys, 32 x 45, brick and structural steel construction, brick foundation.

Two residences, cost $8,000, Architects and builders, R. C. Vaughan & Son, 22 Summerhill Gardens, 2½ storeys, 40 x 64, brick construction and foundation.

Residence, cost $3,600, Dovercourt. Owner and builder, W. G. Simpson, 346 Delaware avenue. 2½-storeys, 24 by 38, brick construction and foundation.

Residence, cost $4,000, Hain avenue. Owner and builder, C. O. Lasky, 426 West Marion street. 2½-storeys, stone foundation, brick construction.

Residence, cost $4,000, Laughton Ave. Owner and builder, W. P. Levack and Miss N. Sykes, 519 Roxton road. 2-storeys, 22 by 40, brick, stone foundation.

3 pairs residences, cost $11,000, Beresford. Owner and builder, Sam. Solodinsky, 2122 Dundas street. Two stys. each pair, 36 by 42, brick construction and foundation.

Residence, cost $2,800, Gothic avenue. Owner and builder, Samuel B. Green, 96 Westmoreland avenue. 2½-storeys, 24 by 38, brick construction and foundation.

Vancouver, B.C.

Residence, cost $12,000, Laurier Ave. and Alexander street, for Victor Spencer, c/o architect. Arch., R. MacKay Fripp, 429 Pender street W. G.C.'s, R. & F. Watson, Box 65 Kerrisdale. 2-storeys, frame construction.

Winnipeg, Man.

5 residences, cost, $15,000. G.C. and owners, Cohen and Meyerowitz, 683 Alfred avenue. 2-storeys, 22 by 28, stone foundation, frame construction.

Power Plants, Electricity and Telephones

Cayuga, Ont.

Town council plan installing hydro-electric system. Clerk, J. W. Sheppard. By-law has been carried by ratepayers.

Fingal, Ont.

Fingal Telephone Company contemplates extending its lines into the Port Stanley district and will have plans prepared at once. Equipment required.

Hagersville, Ont.

The town council is considering the purchase of hydro-electric supplies. Chairman Hydro Com., Reeve McBuney.

Hamilton, Ont.

Generator, cost $25,000, Birch avenue, for Dom. Power and Transmission Co., Terminal Station. G.C., Canadian Westinghouse Co., Ltd.

Kamloops, B.C.

Power station equipment, Barrier River. Clerk, J. J. Carment. Cons. Engr., Du Cane Dutcher & Co., 319 Pender street, W., Vancouver, B.C. G.C.- C. C. Moore, Seattle, Wash.

Power station buildings. Clerk, J. J. Carment. Cons. Engr., Du Cane, Dutcher & Co., 911 Rogers Bldg., Vancouver. Plans, spec., etc., at offices of engineer and clerk. Tenders received by clerk until Jan. 31st, 1913.

Macklin, Sask.

The town council is considering the erection of an electric light plant this year. Sec.-treas., Robert Orr.

Mitchell, Ont.

The town council contemplate installing hydro-electro system. Mayor, Wm. Elliott.

Montreal, Que.

Underground telephone system, cost $2,500,000, contemplated by the Bell Telephone Co. of Canada, Notre Dame W., and St. John streets., has made application to city for above purposes.

The city council are contemplating the purchase of 175 arc lamps for new wards at a cost og $9,088. Supt. of Lighting, M. Parent, City Hall.

North Grimsby, Ont.

The council will at once take up the matter of equipping new lines (to be built) with 60 Watt Tungsten lamps, wiring, etc., required. Reeve, Mr. Smith.

Ottawa, Ont.

The city council plan additional street lighting, orn iron standards, 5-cluster lights, on Albert street, between Bank and Lyon streets. Supt., Mr. Brown, Elec. Dept., City Hall.

Reserve Mines, N.S.

Electric power station. The Cape Breton Electric Co., Ltd., Sydney, N.S., Manager, E. L. Milliken. Electrical Supt., J. B. Bulley. Company will install railway motors, add railway feeder, machine shop equipment, erect two-storey addition to present warehouse & freight shed, new telephone despatching system for Glace Bay, improvement to Sydney power station, switchboard, special railway work, etc.

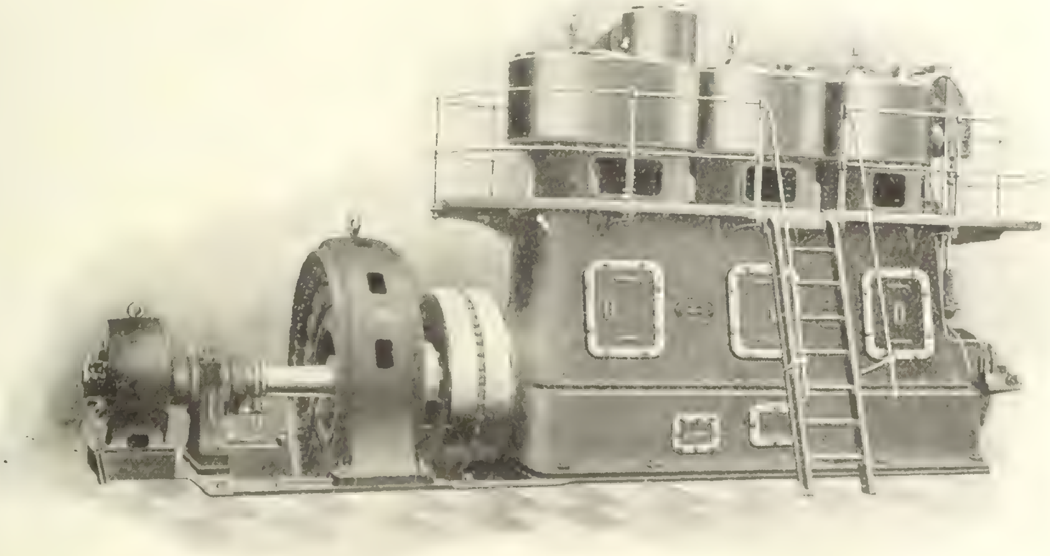
Winnipeg, Man.

A motion is to be made before the Manitoba Government to refer to the public utilities commissioner the investigation of the question of development of extensive hydro-electric projects to be developed and operated by the province.

THE "BROWETT-LINDLEY"

Enclosed, quick-revolution, forced lubrication, steam engines

These engines are built by Browett, Lindley & Co., Limited, Manchester, Eng., and have established an enviable reputation in electric power and tramway plants, collieries, cotton and paper mills, steel and iron works. They are made in five different varieties to suit steam pressure and working conditions.



"Browett-Lindley" three-crank, triple expansion, forced lubrication engine, driving electric generator

Sole Agents for Canada

THE JOHN McDOUGALL
CALEDONIAN IRON WORKS CO., LIMITED

Works: Seigneurs & William Sts., MONTREAL Sales Offices: MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

Manufacturers of Boilers, [illegible] [illegible], Elevators, Engines, [illegible] Engines,
Hydraulic Machinery, Pumps (centrifugal and reciprocating), Steam Turbines, Tanks,
Water Wheels, Water Works Plants

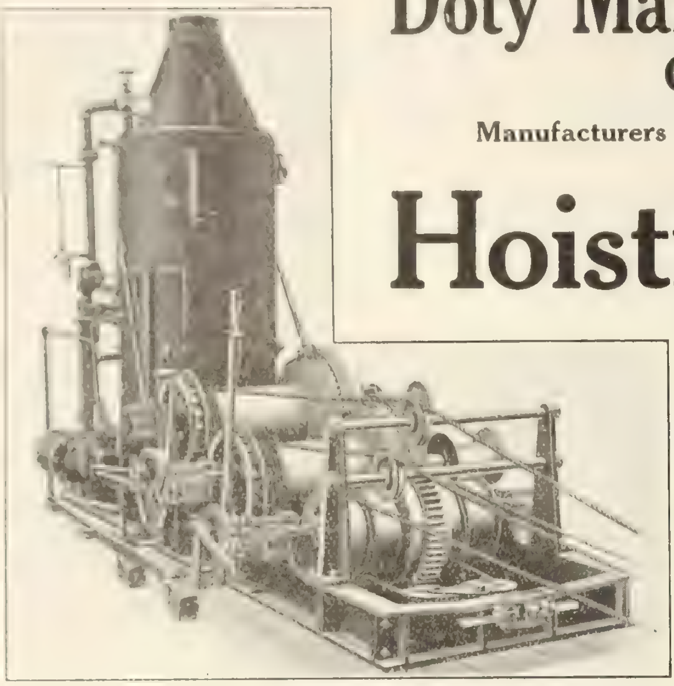
The.

Doty Marine Engine & Boiler

Company Limited

Manufacturers of **Superior**

Hoisting Engines



This cut illustrates our Standard Double Cylinder Double Drum Hoisting Engine with Derrick Swinger attached. "Superior to any other on the market." All parts constructed, guages and templates and every engine tested under steam.

Derrick Swingers, Material Elevators, etc.

for

Contractors, Mines and Quarrymen

A full line of Hoisting Engines, with Boilers to pass inspection in any province, kept in stock by The Doty Engine Works Co., Winnipeg, Man., and also at our

Works—GODERICH, ONT.

To buy our Engines is a Guarantee of Satisfaction

The Thew Shovel for Road Construction

The general use of the Thew Shovel in road building and street grading is conclusive proof that it is adapted to the conditions, economical for the purpose and efficient in operation. The following list of some of the contractors, in the State of New York alone, who have used and are using The Thew No. O Full Circle Swing Shovel in this class of excavation will indicate the popularity of the machine and its undisputed merit on such work :

Joseph Walker, New Paltz, N.Y.
H. B. Sproul, Peekskill, N.Y.
S. B. Van Wagnen, Rondout, N.Y.
James E. Martin, Ploughkeepsie, N.Y.
F. G. Fowler Const. Co., Mt. Kisco, N.Y.
Brown & Lowe, Schenectady, N.Y.
Buckley Const. Co., Plattsburg, N.Y.
Newport Const. Co., Newport, N.Y.
Monroe Roads Co., Pittsford, N.Y.
Santanoni Const. Co., Newcomb, N.Y.
J. D. Moynehan Const. Co., Mohawk, N.Y.
Merritt Const. Co., Tuckahoe, N.Y.
Thos. Fitzgerald, Fredonia, N.Y.
Shanley-Morrissey, Inc. New York, N.Y.
M. F. Dollard, Albany, N.Y.
M. A. Aldrich, Ploughkeepsie, N.Y.
James Anderson & Sons Co., Albany, N.Y.
Raymond M. Booth, Albany, N.Y.
Barber Asphalt Co., Buffalo, N.Y.
Jos. F. Stabell Co., Buffalo, N.Y.
Thos. Brown Const. Co., Buffalo, N.Y.
A. J. Rockwood, Rochester, N.Y.
F. C. Humeston, Brooklyn, N.Y.
H. P. Burgard, Buffalo, N.Y.
Eastern Concrete Steel Co., Buffalo, N.Y.
W. J. Burns Co., Rochester, N.Y.
Whitmore, Rauber & Vicinus, Rochester, N.Y.
James Garafano & Sons, Mt. Vernon, N.Y.
Cunningham-Woodard Co., Hudson Falls, N.Y.
F. A. Brotsch, Jr., Rochester, N.Y

The Thew Shovel is popular because it can do the work.

There is no other shovel of equal weight and dipper capacity that can handle as difficult material, nor under equal conditions, as large an output as the No. O Thew.

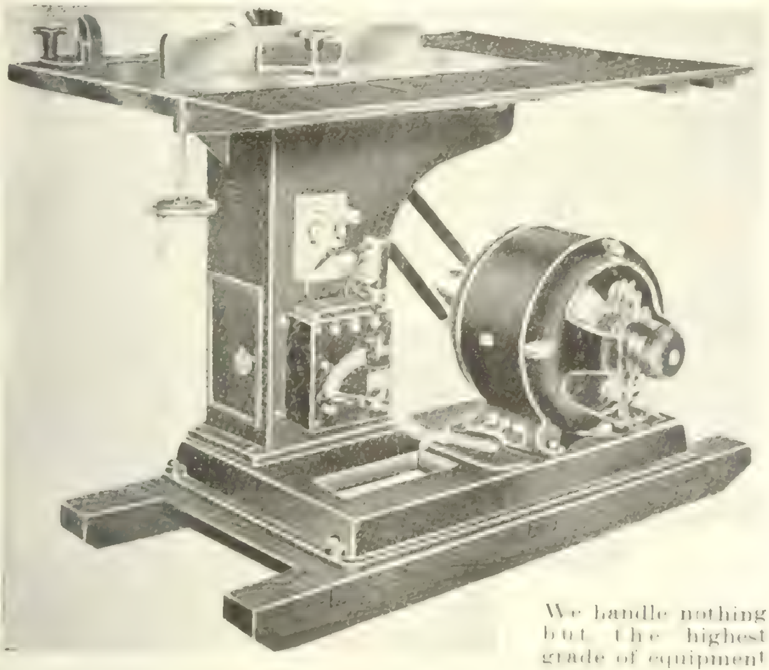
Investigate the Thew Horizontal Crowding Motion.

Write for Catalog and Information

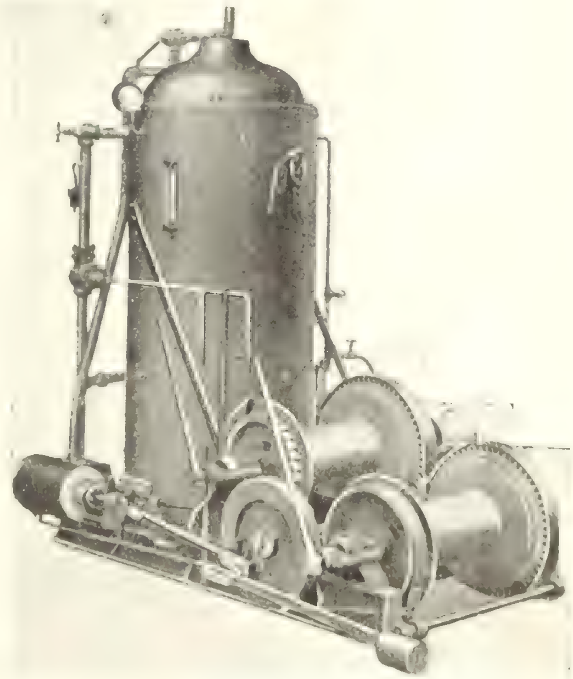
THE THEW AUTOMATIC SHOVEL CO., Lorain, Ohio

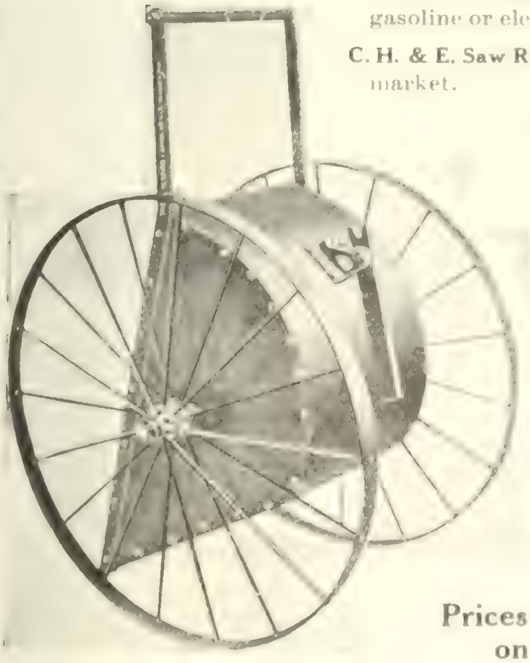
CONTRACTORS

First Class Equipment Means ECONOMY



We handle nothing but the highest grade of equipment on the market.





Chain Belt Concrete Mixers—All sizes in stock: steam, gasoline or electric power.

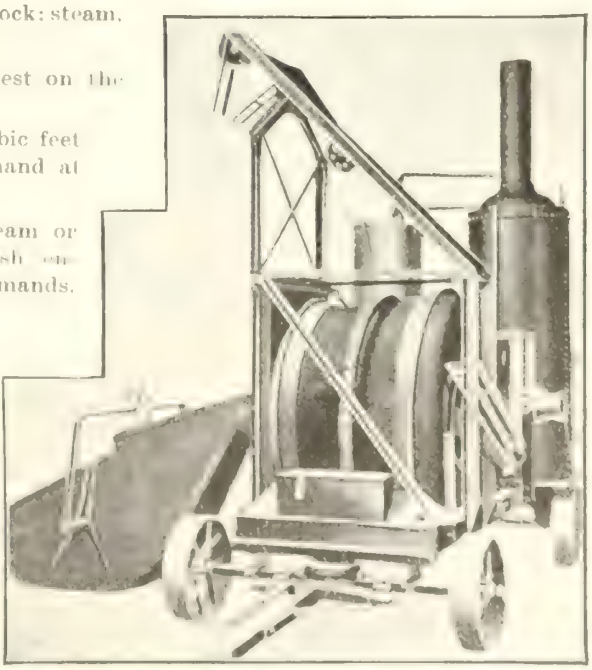
C. H. & E. Saw Rigs Proven to be the best on the market.

Concrete Carts — Six cubic feet capacity. Stock on hand at all times.

Hoisting Engines — Steam or gasoline: we furnish engines to meet all demands.

Briggs Concrete Spreaders The best and most economical concrete for street paving work.

Full line of Railway and General Contractors' Equipment.



Prices and Catalogues on Application

Dominion Equipment & Supply Company

WINNIPEG, 45-46 Canada Life Building **VANCOUVER**, 839 Beatty Street
EDMONTON, P. O. Box 1623

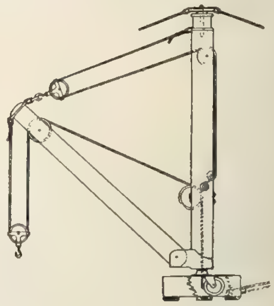
HOISTING ENGINES

DERRICKS

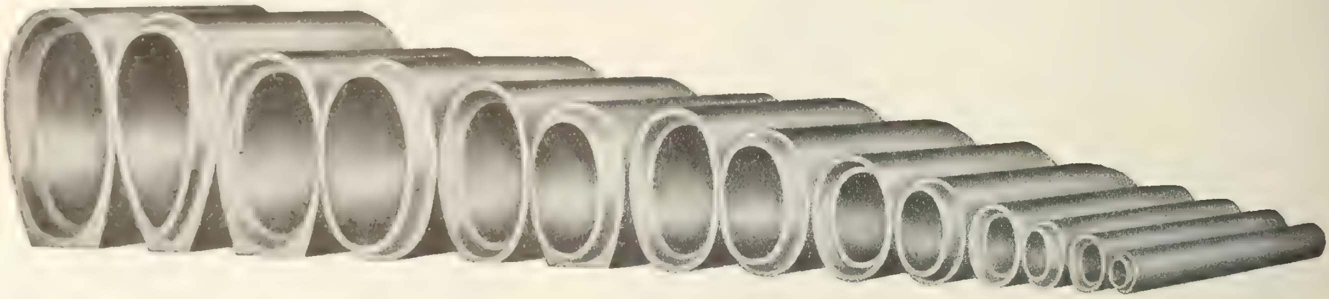
Horse Powers Winches or Crabs

Standard sizes and capacities of Derricks
in stock for immediate shipment

Get our catalog and prices. They will
interest you—All goods guaranteed.



MARSH & HENTHORN
Limited
Makers of Hoisting Machinery
Belleville, Ont.
Sales Agents : MUSSENS LIMITED, Montreal



Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

STANDARD REINFORCEMENT, or SPECIAL if requirea. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario

EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2 27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative : E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

MARQUISES

in Wrought Iron, Sheet Metal or Glass

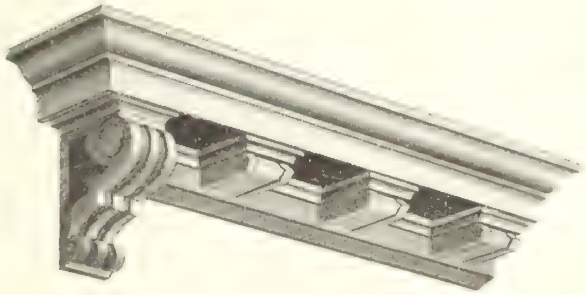
Prompt and Satisfactory Execution of Catalogue or Special Designs

Dennis Wire & Iron Works Co.
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET

WRITE FOR OUR

Galvanized Cornice

CATALOGUE



We illustrate scores of designs from which to choose or which will give you suggestions from which to design your own cornice.

Catalogue or special designs executed promptly by thoroughly competent workmen.

The Metallic Roofing Co. LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.
(46)

Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, ***General Sales Agent***
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers

THE TEST

The first Creosoted Wood Block Pavement laid in America was on Tremont Street, Boston, Massachusetts, twelve years ago.

This pavement was laid to secure a test of the wearing qualities of Wood Block.

The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

The Asphalt was taken up some time ago and street newly paved.

The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

The Dominion Creosoting Co., Ltd.
Vancouver, B. C.

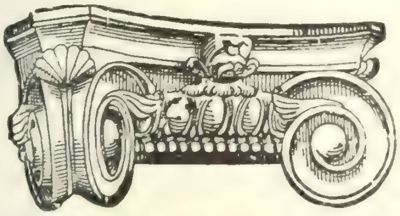
Argenteuil Granite Co., Limited

42 Craig Street West, MONTREAL

We are in the market to bid on your plans for granite on buildings.

Our up-to-date cutting plant, excellent quarries and good shipping facilities enable us to make close prices.

SEND US BUILDING PLANS TO-DAY



Centre Pieces, Brackets, Veranda Capitals and Freizes. Claphams Grey Wainscoat Cement Finish for Bathrooms, Kitchens, Lavatories, etc.

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69 Hughson Street N. - - HAMILTON

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Toronto Safe Works

Established 1855 TORONTO

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Standard Bank Building,

TORONTO

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Glass of all kinds and Patterns for Dwellings, Stores, Offices, Public Buildings and Churches.

Church and Domestic Art Glass

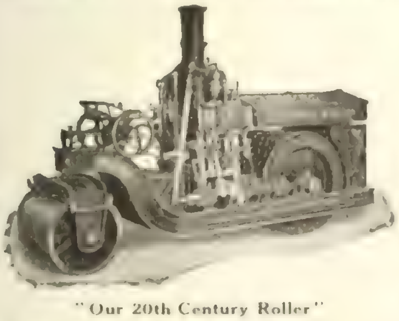
in Lead, Electroglazed and Copper Bar

Ornamental Chipped and Sand Cut Glass. Bevelled Plate and Mirrors. Plate and Window Glass

ERIE MACHINE SHOPS

P. W. DIETLY

Proprietor



"Our 20th Century Roller"

Send for our Catalogue of Asphalt Rollers and Mixers.

1303 PEACH STREET - ERIE PA.

Tenders

A few dollars spent in advertising your proposals in

The Contract Record

would result in additional competition, which might save your city or town or your client many hundreds of dollars.

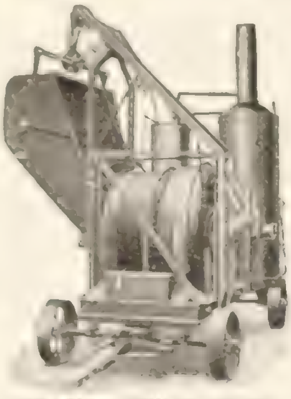
Deeds, Not Words!

Mr. Contractor—Don't take our word for it, that we have the best **Concrete Mixer** on the market, but ask any contractor who has used, or is using the

Chain Belt Mixer

just what he thinks of it.

IN MILWAUKEE there were about twenty concrete mixers sold in 1911, and fourteen were **Chain Belts.** Six of [illegible] concerns have their plants in Milwaukee. [illegible], Mr. Contractor.



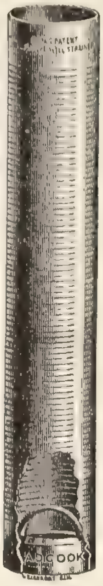
The Mixer With the Bulge

Where there is big construction work you will generally find a **Chain Belt Mixer** on the job. You owe it to yourself to investigate the **Chain Belt** before placing your order.

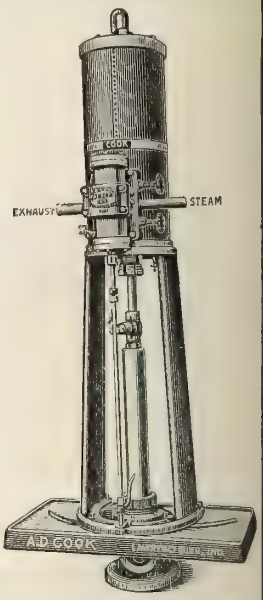
We also make elevators and gravity distributing systems. Send to-day to any of our agents for information.

Chain Belt Co.
Milwaukee, Wis.

CANADIAN AGENTS:
Winnipeg Dominion Equipment & Supply Co.
Vancouver – Dominion Equipment & Supply Co.
Montreal—Canada Machinery Agency
Ottawa—The General Supply Co. of Canada



Water Supply from Deep Wells



is obtained at a minimum cost by use of our deep well pumps.

Write for Bulletin 26 explaining the use of Cook's Patent Brass Tube Well Strainer.

A. D. COOK

Lawrenceburg, Indiana, U. S. A.

Manufacturer of a Complete line of **DEEP WELL SUPPLIES** including Steam, Belt and Motor Driven **DEEP WELL PUMPS**, Wind-mill and Hand Pumps, Working Barrels and Valves, Pump Rods and Pump Rod Joints, Drill Rods and Drill Rod Joints, Drilling and Well Tools.

CATALOGUE MAILED UPON REQUEST.

WE SPECIALIZE IN INTERIOR FITTINGS

Our plant was designed specially for the manufacture of the finest fittings for BANKS, LIBRARIES, OFFICES, STORES AND PUBLIC BUILDINGS.

Architects and contractors requiring the very highest class of interior woodwork should send us their specifications. List of customers and references gladly furnished.

The
Oshawa Interior Fittings Company
OSHAWA, ONT.

PURE WATER

It is easy to obtain with our plants and apparatus

We design and contract for complete municipal filtration plants of any capacity.

We supply and install apparatus for sterilizing water supplies by the application of calcium hypochlorite.

Literature, Sketches, Estimates and Recommendations Supplied on Request

American Water Softener Co.
1001 Chestnut St., PHILADELPHIA, Pa.

We have no affiliations or working acquirements with any of our competitors.

The Hotchkiss Lock Steel Forms

For sidewalks, street cross-walks, curbs, curb and gutters, driveways, pavements and wall forms. Also fence post and reinforcements.

Special offers for export trade, introductory and demonstrative purposes only.

Write for illustrated folder.

Hotchkiss Lock Metal Form Co.
Dept. S BINGHAMPTON, N.Y

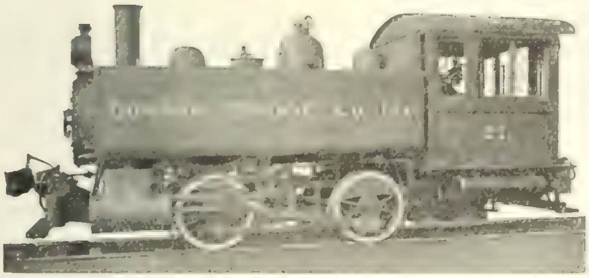
Engines and Boilers

of all types and sizes, Heaters, Tanks, Pumps, etc.

E. Leonard & Sons LONDON ONT.

AGENTS:
Montreal St. John, N. B. Winnipeg Calgary Vancouver

SELECTION OF LOCOMOTIVES



WHAT SHOULD BE KNOWN BEFORE YOU PURCHASE LOCOMOTIVES.

Nature of the service.
Capacity of the cars and weight of train.
Character of track—is it new or old.
Length of haul.
Is time an important factor.
Do you want a quick locomotive or a big puller.
Distance from base of supplies and quarters for the men.
Water and coal carrying capacity.

All these items and more should be considered. A careful study of conditions may mean larger profits.
Our experience may be valuable in considering them. A dollar saved is more than a dollar earned.
Write or wire us, or better still, come to see us.

MONTREAL LOCOMOTIVE WORKS, LIMITED
Rooms 702-704 Dominion Express Building, MONTREAL, Canada

Cumberland County Quarries
Red and Grey Freestone
Oakley Myers, Amherst, N.S.
Hardens with Age. Low Price. Samples and Quotations Free

Crushed Stone, Limited

STONE of any Size and in any Quantity on hand for Sidewalks, Roadwork or Concrete Work

Works :
Kirkfield, Ont.
Phone Main 4516

Head Office :
47 Yonge St. Arcade, TORONTO
G. W. ESSERY, Manager

Steel and Wood **TANKS**

Suitable for Sprinkler Systems Fire Protection, Water Supply Plants, etc.

Steel Substructures of all kinds
(Galvanized or Painted)

Windmills, Gasoline Engines, Hydraulic Rams, Etc.

Ontario Wind Engine & Pump Co.
Limited
TORONTO WINNIPEG CALGARY

Ambursen Hydraulic Construction Co. of Canada, Limited

Concrete-Steel Dams, Bulkheads, Flumes, Transmission Lines, Power Houses and General Hydraulic Construction

New Birks Building - - - - MONTREAL

Hauling and Hoisting Ropes

Derrick and **Dredge** Ropes
Ropes for House Moving
Saw Carriage Ropes
Smoke Stack Stays
Standard or Lang's Lay

Wire Rope Fittings Wire Rope Grease

The B. Greening Wire Co., Limited

HAMILTON, ONT. MONTREAL, QUE.

Current Prices of Building Material.

BRICKS

The following are wholesale prices delivered at Toronto:—

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock Lumber—		
2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—		
1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving..	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—	
in. casing per 100 ft.	2 00
in. casing per 100 ft.	2 25
in. pine base, per 100 ft.	3 25
0 in. pine base, per 100 ft.	4 25
in. pine window stool	2 75

Shingles—	
XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

edar Posts—Fence—	
in. at small end, each	25
in. at small end, each	35
lemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent for D.D

		Star	D.D.
10 to 25	united inches	$4 25	$ 6 25
26 to 40	"	4 60	6 75
41 to 50	"	5 10	7 50
51 to 60	"	5 35	8 50
61 to 70	"	5 75	9 75
71 to 80	"	6 25	11 00
81 to 85	"	7 00	12 50
86 to 90	"		15 00
91 to 95	"		17 50
96 to 100	"		20 50
01 to 105	"		24 00
06 to 110	"		27 50

The following are wholesale prices for glass t Montreal and jobbing prices at Winnipeg for ox lots:—

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
00		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i. ..	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions; 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in. .. .	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.30; 1-inch, $1.35; ⅜-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Power & Son,
Architects and Building Surveyors
Merchants Bank Chambers,
Kingston, Canada

Geo. M. Miller & Co.
Architects
Toronto General Trust Building TORONTO

The
Laurentian Granite Co.
Limited
MANUFACTURERS OF
Building Granite, Granite Setts, Curbing, Crushed Granite
Samples Furnished and Prices Quoted on Application
Rose and Pink Granite Quarries at Staynerville, P. Que., Co. Argenteuil, on C.P.R.
Bank of Ottawa Bld'g.
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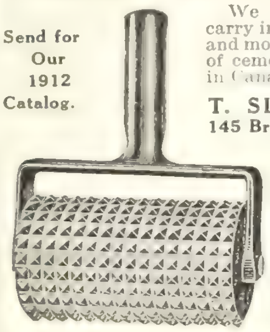
Montreal

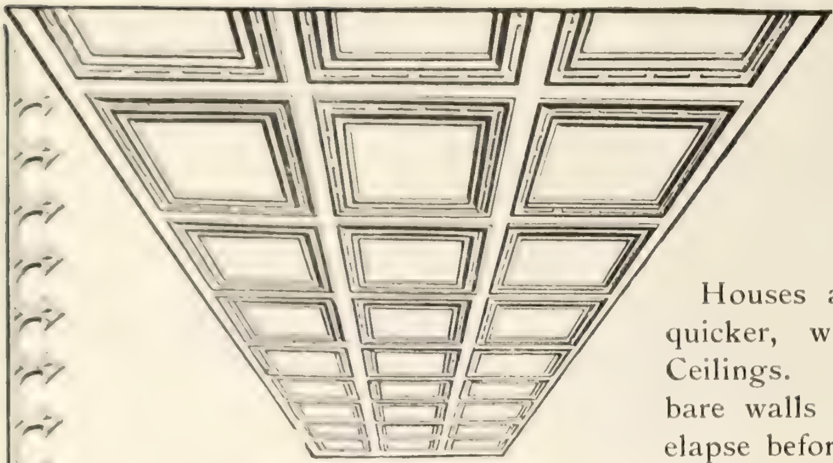
Cement Sidewalk Tools
Send for Our 1912 Catalog.

We manufacture and carry in stock the largest and most satisfactory line of cement sidewalk tools in Canada.
T. SLACK & CO.
145 Brock Ave., Toronto
Representatives
A. Bremner, Montreal. Forbes & Van Horn, Vancouver. H.S.Howland, Sons & Co., Toronto. Winnipeg Tool & Forging Co., Winnipeg. J. H. Ashdown, Ltd., Winnipeg.

A Chance to Save on Sidewalk Tools

"Abram" Sidewalk Tools have no competttitors they are the original and only automatic "Wrist Motion" long handled tools. Write at once for our special December discount offer, and catolog free. Every set sold with a guarantee.
Abram Cement Tool Co.
105 Ouellett Avenue
WINDSOR ONTARIO

J. HARVEY
CONTRACTOR
Greeneville - - Ont.
Driller of Oil, Gas, Salt or Artesian Wells
Deep Wells a Specialty
20 YEARS' EXPERIENCE IN CANADIAN OIL FIELD

Contracts taken in any part of Canada. Several years experience in Artesian Wells for Municipal Water Works. Estimates or geological information cheerfully furnished.
References Given



Do You Build on 'Spec'?

Houses and stores sell better, and rent quicker, when ceiled with Preston Steel Ceilings. People don't like to live amid bare walls for the year that must usually elapse before plaster dries.

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For Railroad and Municipal Contractors

Are known from coast to coast for their strong construction and durability, and are in use on the largest construction works in the country.

Only the very best materials enter into their manufacture and our trade mark stamped on every shovel is a positive guarantee that goods are as represented.

Our Round Point Socket Strap Plain Black Shovel

The Shovel That Stands The Test

We will send to any contractor, free, express prepaid, upon request, a sample shovel, which will speak for itself. Send also for our illustrated catalogue, showing our full line of Shovels, Spades, Scoops, Draining Tools, etc.

Carried in stock by all leading wholesalers, or direct from the manufacturers

Trade Mark

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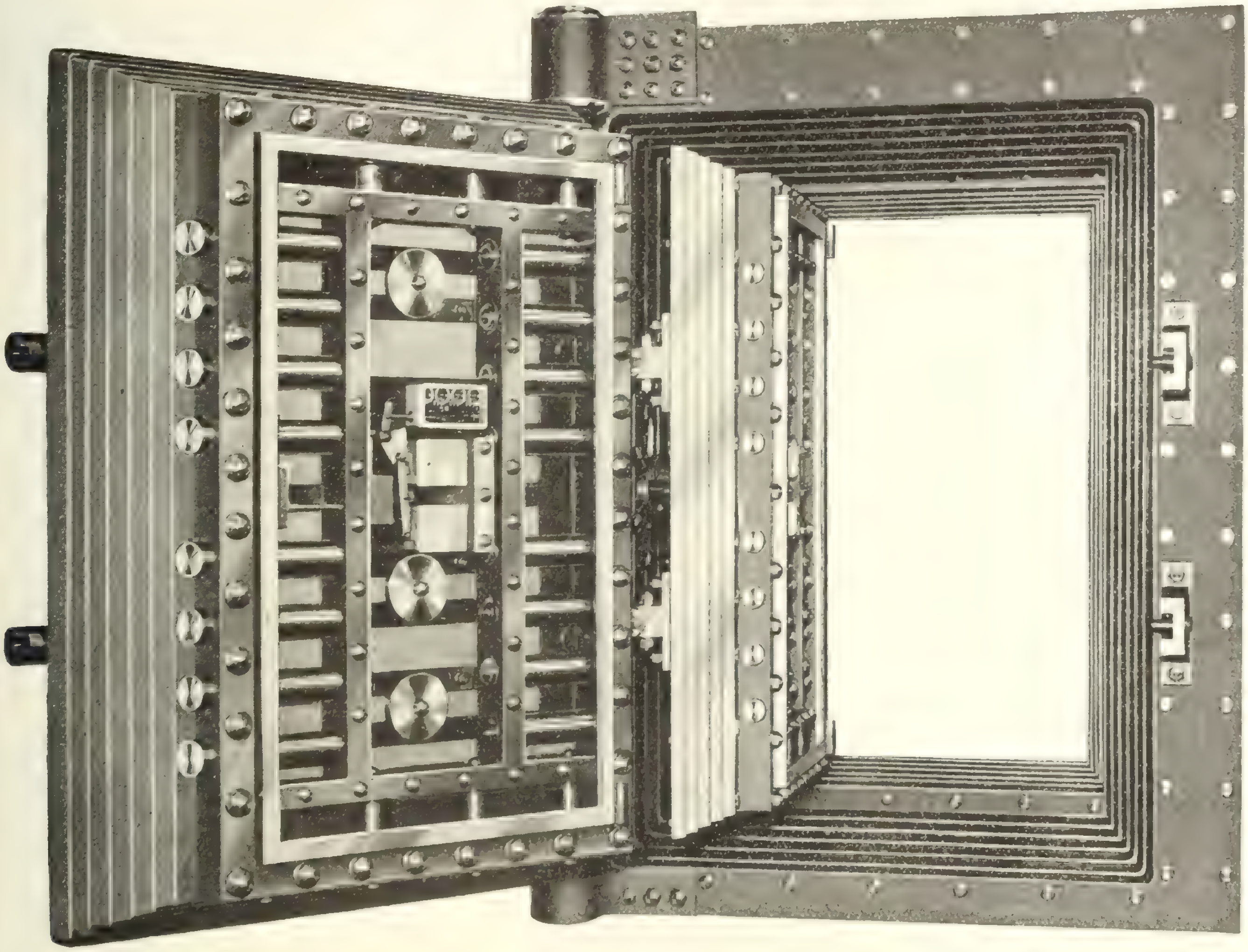

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Note tremendous metal weight on this floor. Entire building of Alsen's Cement reinforced concrete.

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was selected in 1905 for the Panama Canal in preference at equal prices and has exceeded those severe requirements. Sold under a guarantee other Portlands cannot make in good faith. Other brands have been supplied only on modified specifications.

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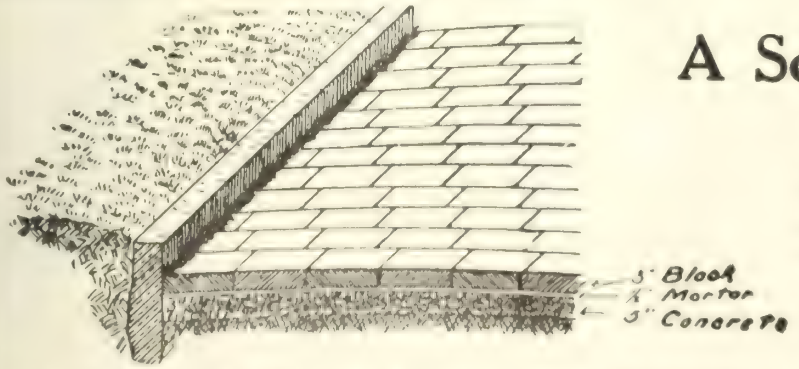

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Study These Figures

POPULATION OF WINNIPEG

1902	48,411
1904	67,262
1906	101,057
1908	128,000
1910	151,450
1911	172 000
1912	200,000

BUSINESS GROWTH
Winnipeg Bank Clearings

1902	$188,370,033
1904	294,601,437
1906	504 585,914
1908	614,111,801
1910	953,415,281
1911	1,172,762,142
1912	1,537,817,524

INDUSTRIAL GROWTH
Increase in Winnipeg Factory Output

1900	$ 8,606,248
1905	18,983,248
1910	39,400,608

Over 300 Factories
18,000 hands employed.
$40,000,000 invested.

WELCOME TO VISITORS

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Headquarters Winnipeg Industrial Bureau, corner of Main and Water streets, Winnipeg with 104,000 feet of floor space, Art Gallery and Convention Hall, with 5,000 seating capacity.

Study These Figures

TOTAL ASSESSMENT
Winnipeg Realty Values

1900	$ 25,077,400
1902	28,615 810
1905	62,727,680
1906	80,511,727
1909	131,402,800
1911	172,677,250
1912	214,360,440

1912 Tax Rate—12 mills.

BUILDING GROWTH
Winnipeg Building Permits

1903-4-5	$26,264,500
1906-7-8	24,444,300
1909	9,226,325
1910	15,116,450
1911	17 550,000
1912	20,475,350

PROGRESS IN SCHOOLS

	No. of Teachers	Attendance
1871	1	35
1886	49	2,831
1900	119	7,500
1905	192	11,675
1910	340	17,738
1911	381	20,167
1912	450	22,500

Manufacturers Get Information At Once About This Rich Market

Locate your factory in the Central City of Canada, where you can get CHEAP POWER, cheap sites, low taxation, plentiful supply of raw materials, best of labor conditions and unexcelled railway facilities.

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50,000 SURPLUS H.P.

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30 INCH DIAMETER

LAP WELDED STEEL PIPE

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James Robertson Co. Ltd. -	St. John, N. B.
G. R. Duncan - -	Fort William, Ont.
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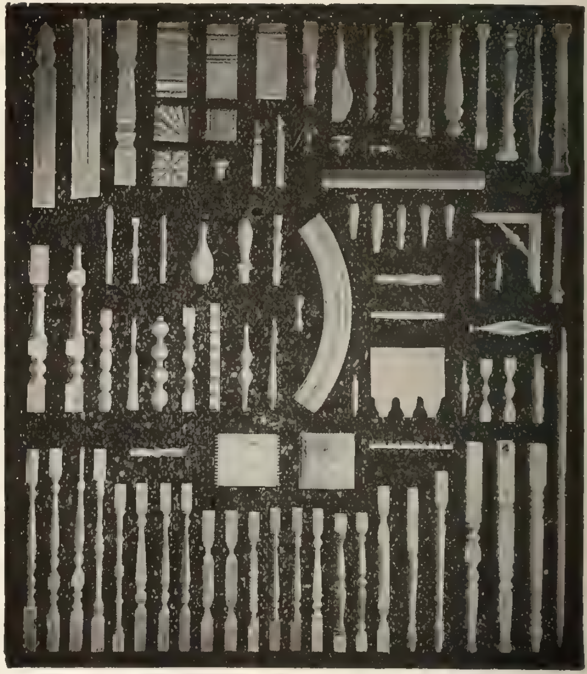

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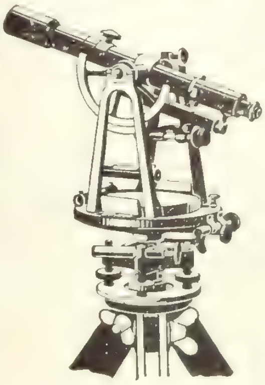

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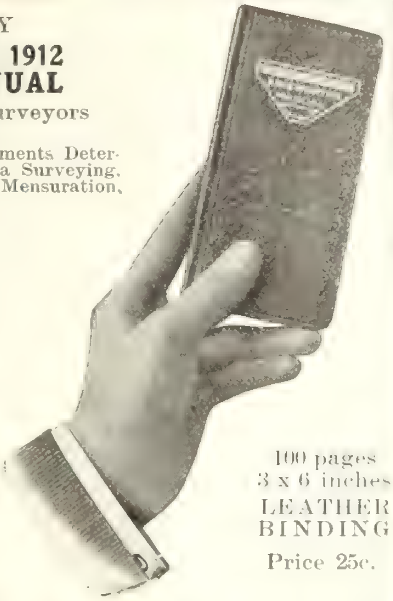

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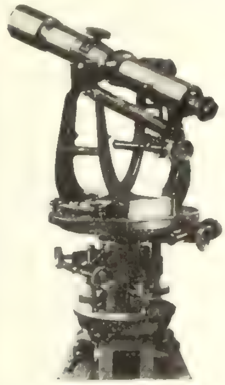

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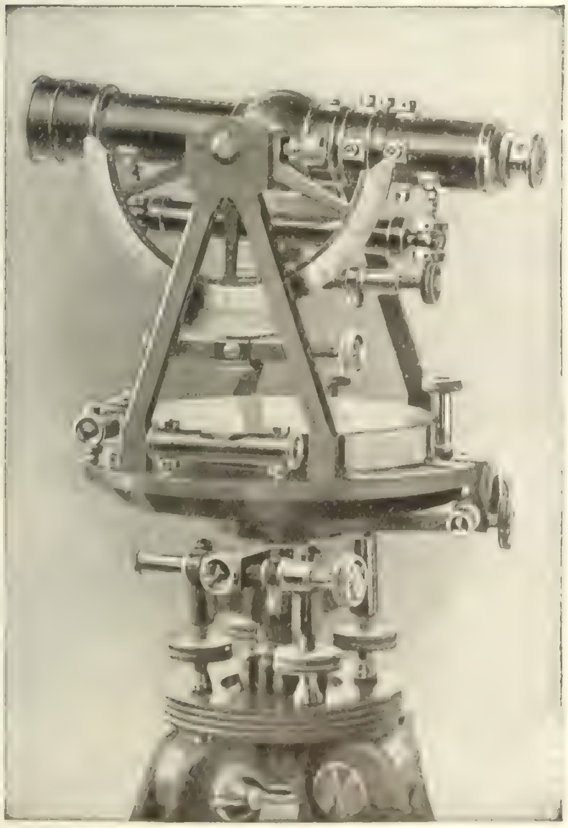

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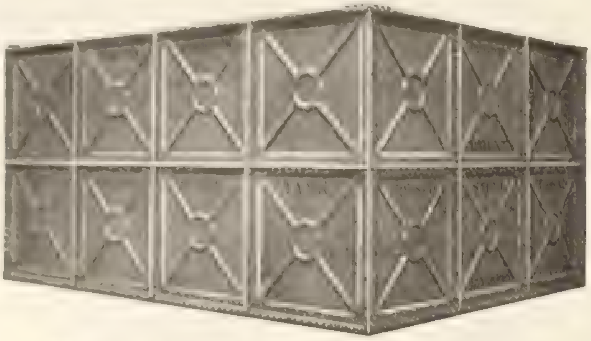

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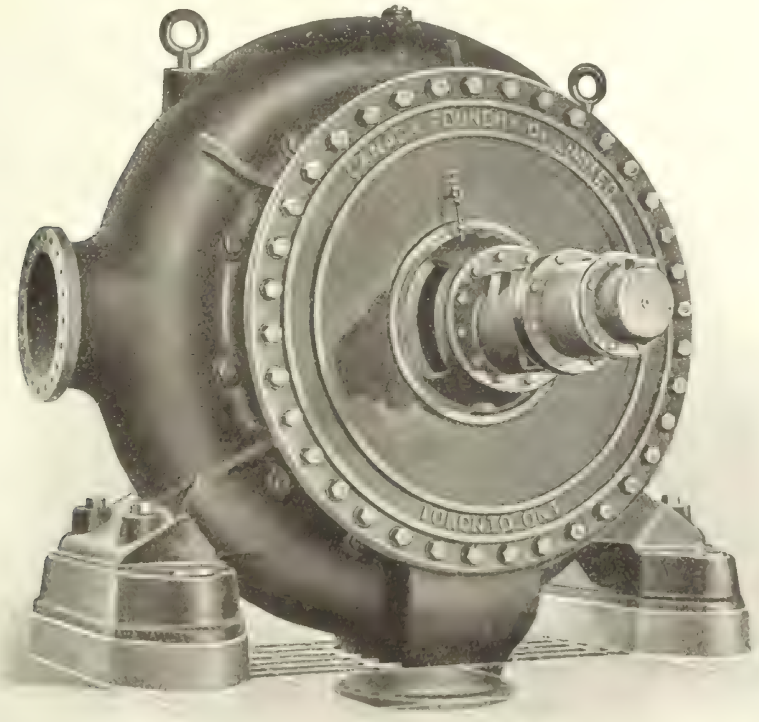

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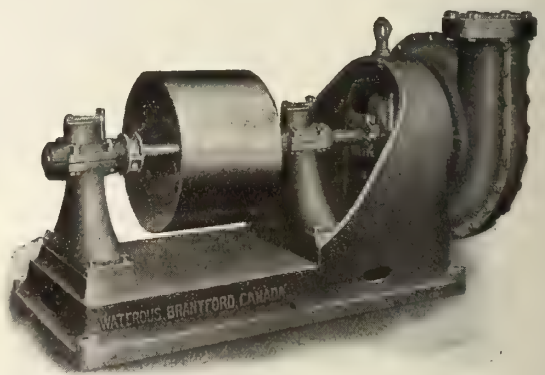

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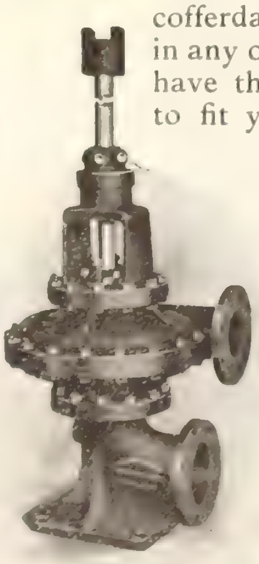

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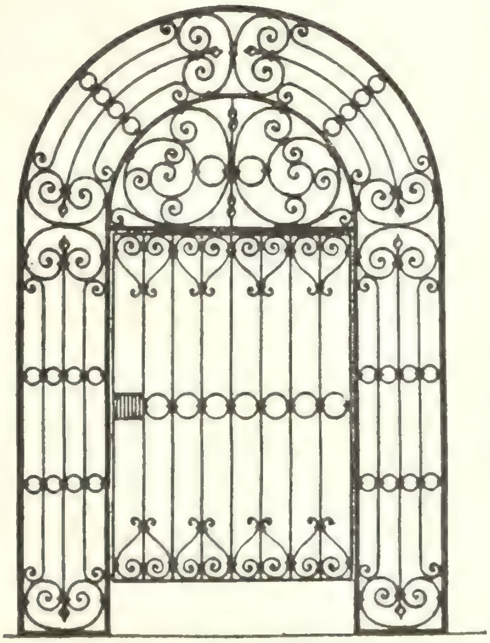

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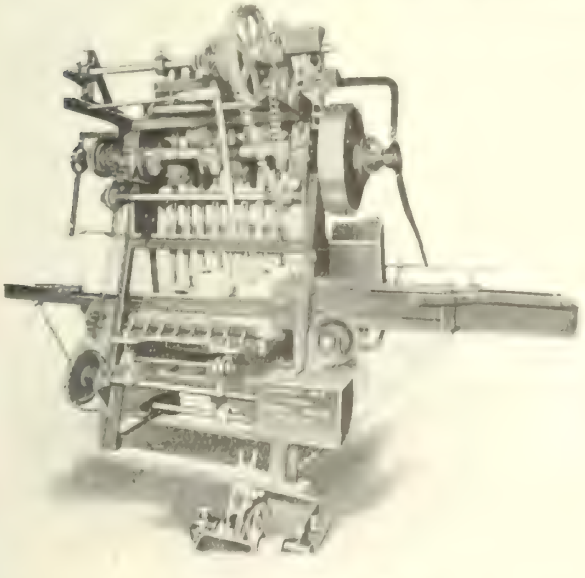

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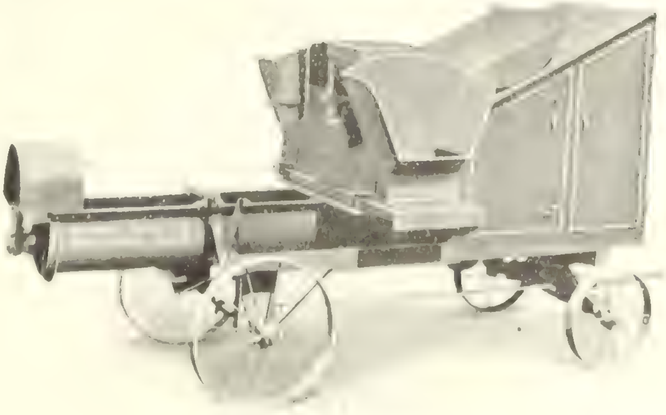

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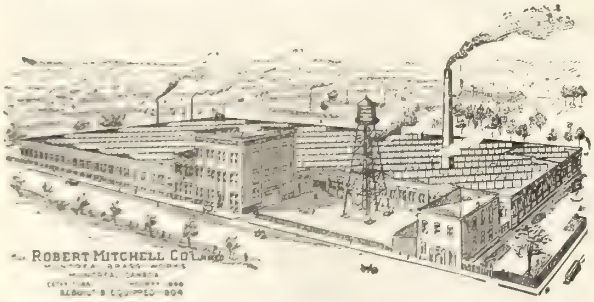
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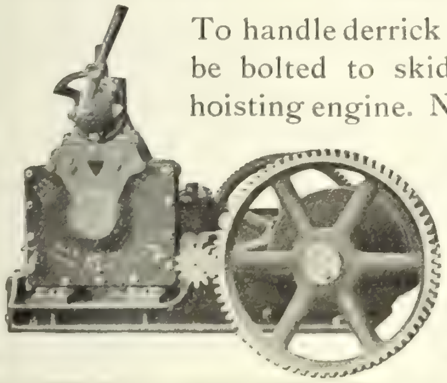

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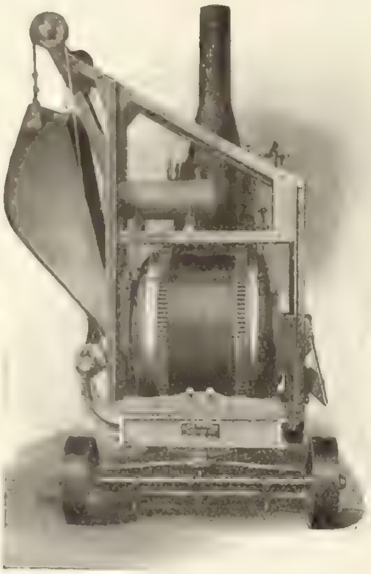

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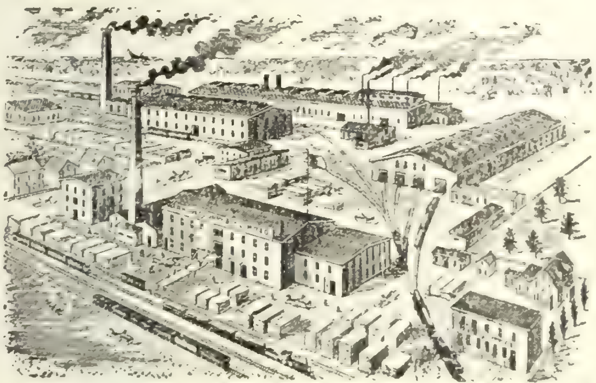

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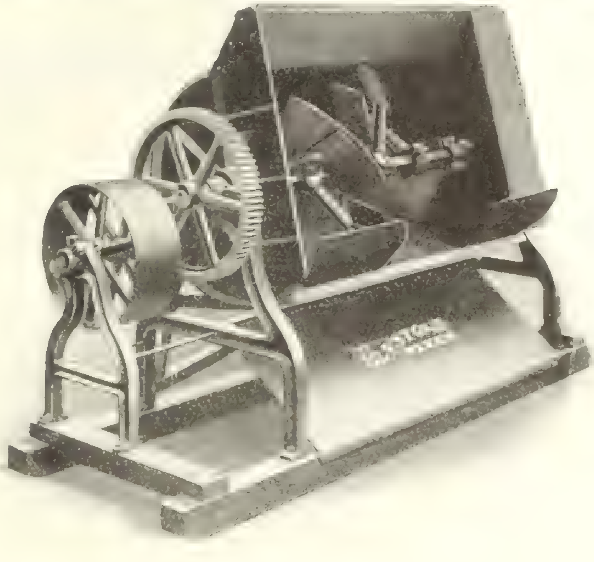

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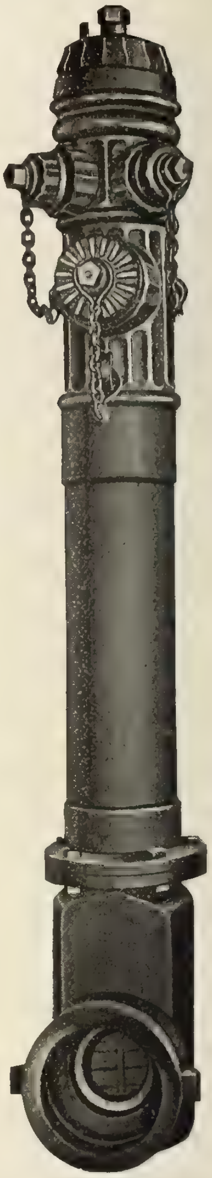

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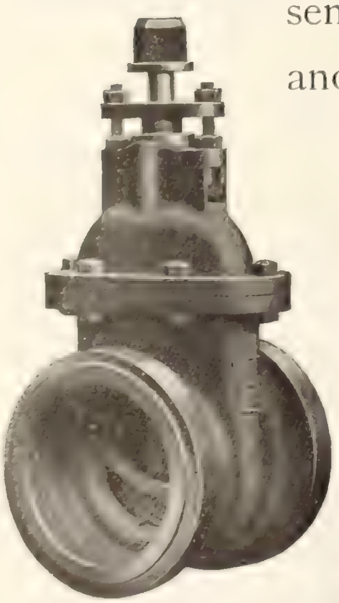

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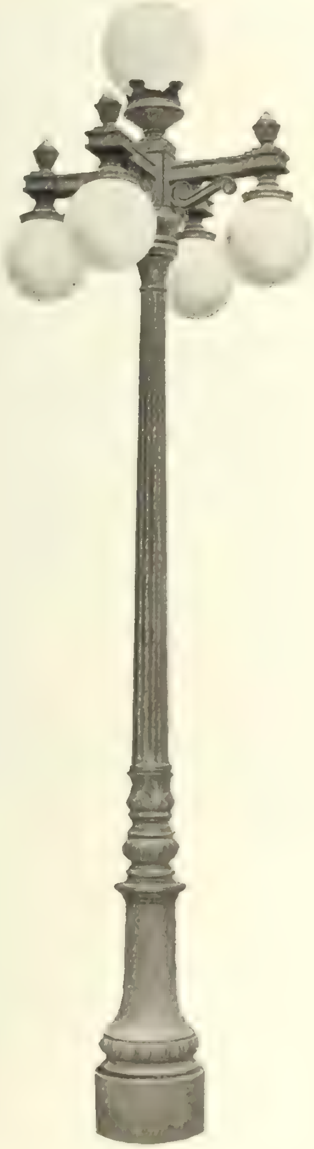

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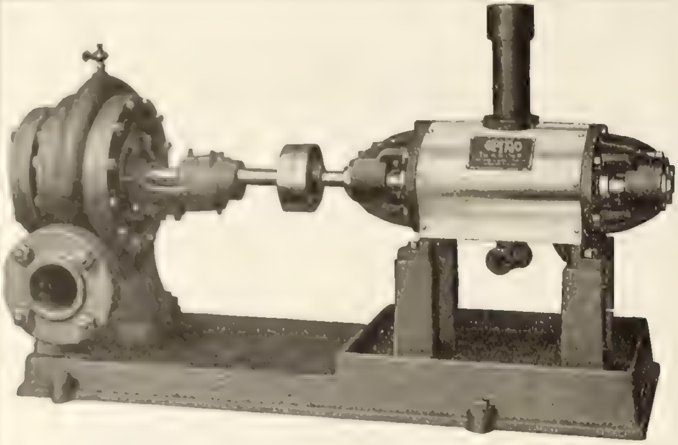

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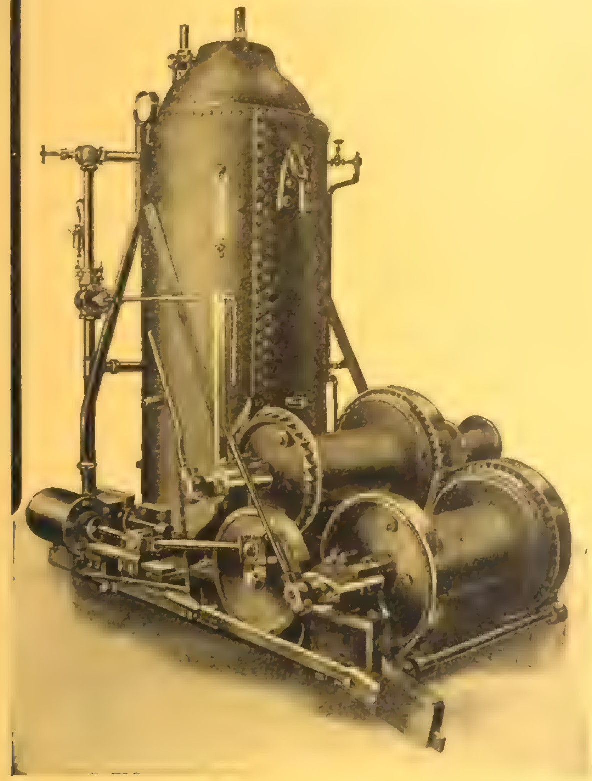

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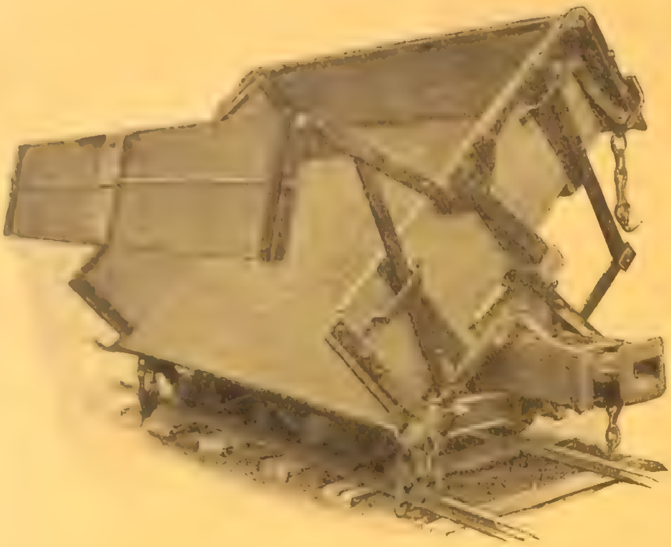

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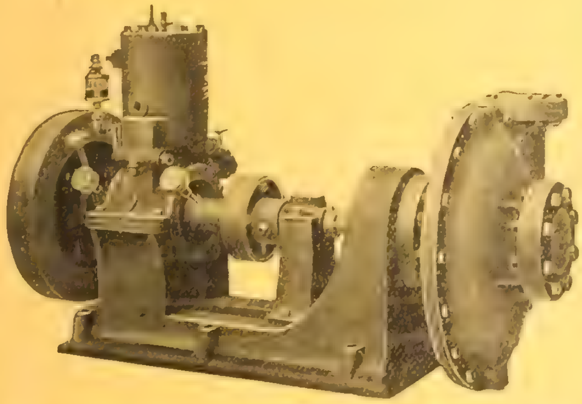

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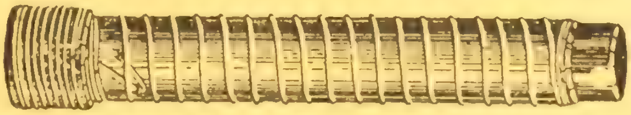

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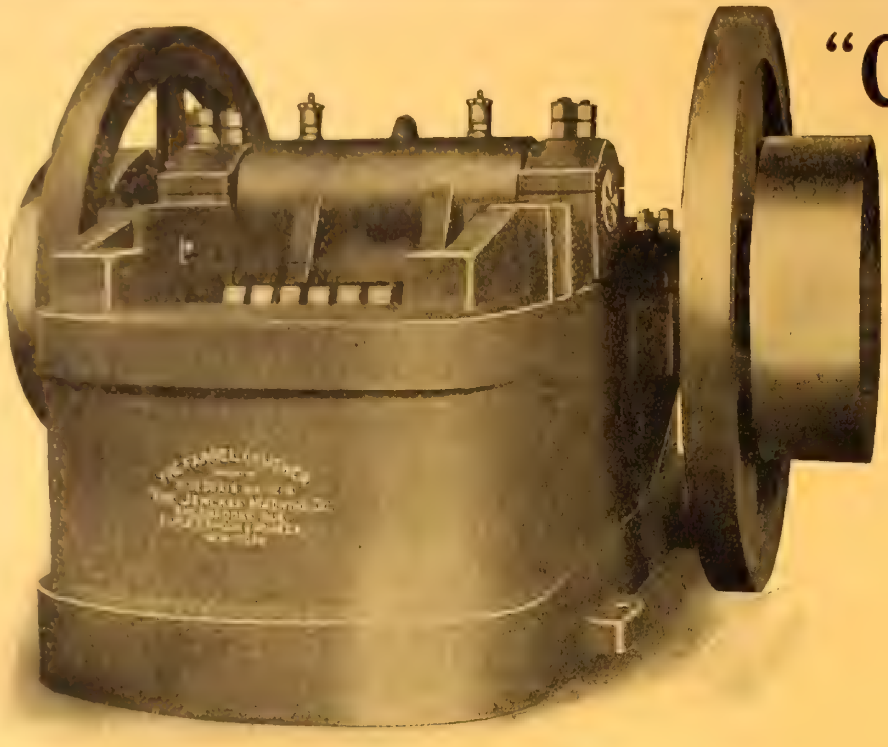

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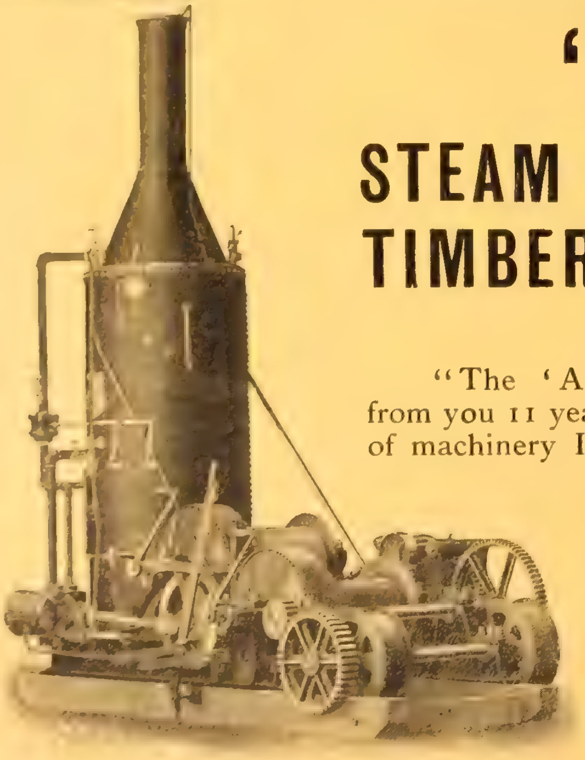

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STEAM AND ELECTRIC HOISTS
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OF ALL CAPACITIES

"The 'AMERICAN' Derrick Engine purchased from you 11 years ago has been the most satisfactory piece of machinery I have ever owned.

"It has been in constant daily use with less than 10 dollars' worth of repairs
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Please send prices and information on
'AMERICAN' State
whether Engines, Der-
ricks, etc.
AMERICAN HOIST
& DERRICK CO.,
St. Paul, Minn.
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American Hoist & Derrick Co., St. Paul, U.S.A.

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When you, Mr. Engineer, plan a building—or when you Mr. Contractor, erect it—you are usually anxious to get it completed as soon as possible.

Delay in completion is certain to cause complaints and confusion—and is likely to cause financial loss.

Therefore, in selecting materials, it is to your advantage to specify the Cement made by the Company best equipped to supply your requirements quickly, for thus you reduce the danger of delayed delivery. The Canada Cement Company's mills—located at Exshaw, Calgary, Winnipeg, Port Colborne, Shallow Lake, Belleville, Marlbank, Lakefield, Hull and Montreal—are so placed as to provide the quickest possible delivery to any point in Canada.

WE HAVE CANADA-WIDE DISTRIBUTION

Quick delivery is an important point. Complete delivery of your whole order is even more important. Canada Cement mills have sufficient capacity to completely fill all orders promptly.

Write for "Factories and Warehouses of Concrete."
It will interest you. Enclose 12 cents in stamps for postage.

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No. 62 Herald Building - MONTREAL
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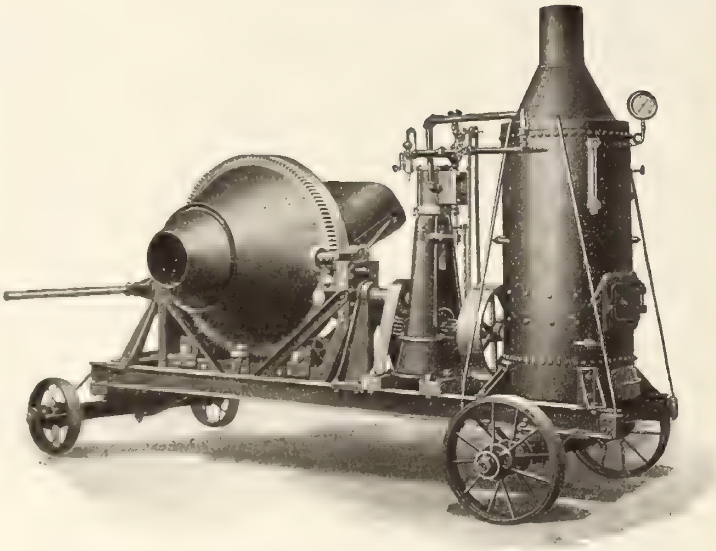
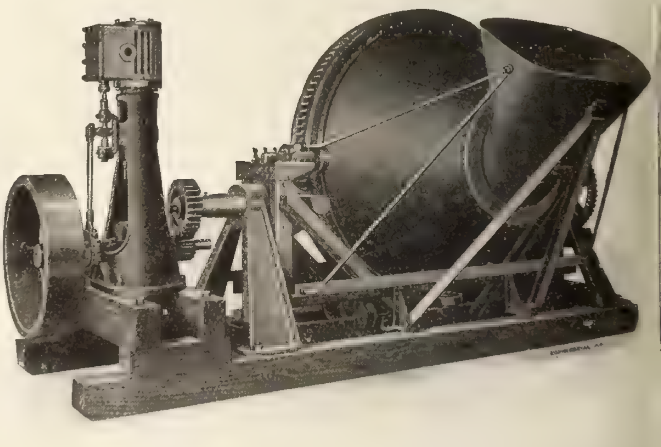
Make 1913 You Best Year



Standard Smith Mixer on Trucks with Boiler and Engine

Put reliable mach
ines in your plant-
machines you ca
depend upon to d
your work — not t
lie idle needin
repairs.

The **"SMITH"** Concrete Mixer is the machine you can depend upon to work every hour in the day and every day in the year.



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ONE WAY

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MITH
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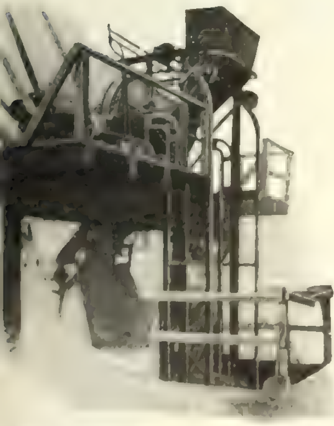
Smith Mixers on the Job

SMITH MIXERS are so well constructed that they require few repairs the first Smith Mixer, built in 1900, withstood ten years of constant and hard usage.

SMITH MIXERS give results.

Others have made records, and so can *you.*



h Mixer with Power-Charging Attachment.
Guide Tracks Extended

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Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

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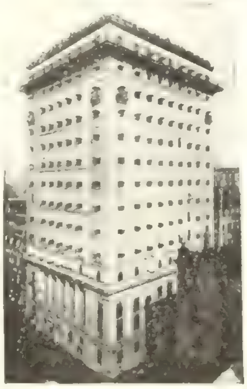
J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.

Don Valley Fireproofing, Bricks and Tile used throughout.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.



Traders Bank, Toronto

Carrere & Hastings and F. S. Baker, Associate Architects.

Don Valley Porous Terra Cotta Fireproofing and 2,0000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Royal Bank, Toronto

Eustace G. Bird, associated with Carrere & Hastings, Architects. Norcross Bros., Contractors.

Don Valley Porous Terra Cotta Fireproofing and Bricks used

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

Bell Telephone Building

Adelaide Street, Toronto

W. J. Carmichael, Architect. [illegible] [illegible] Contractors.

Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

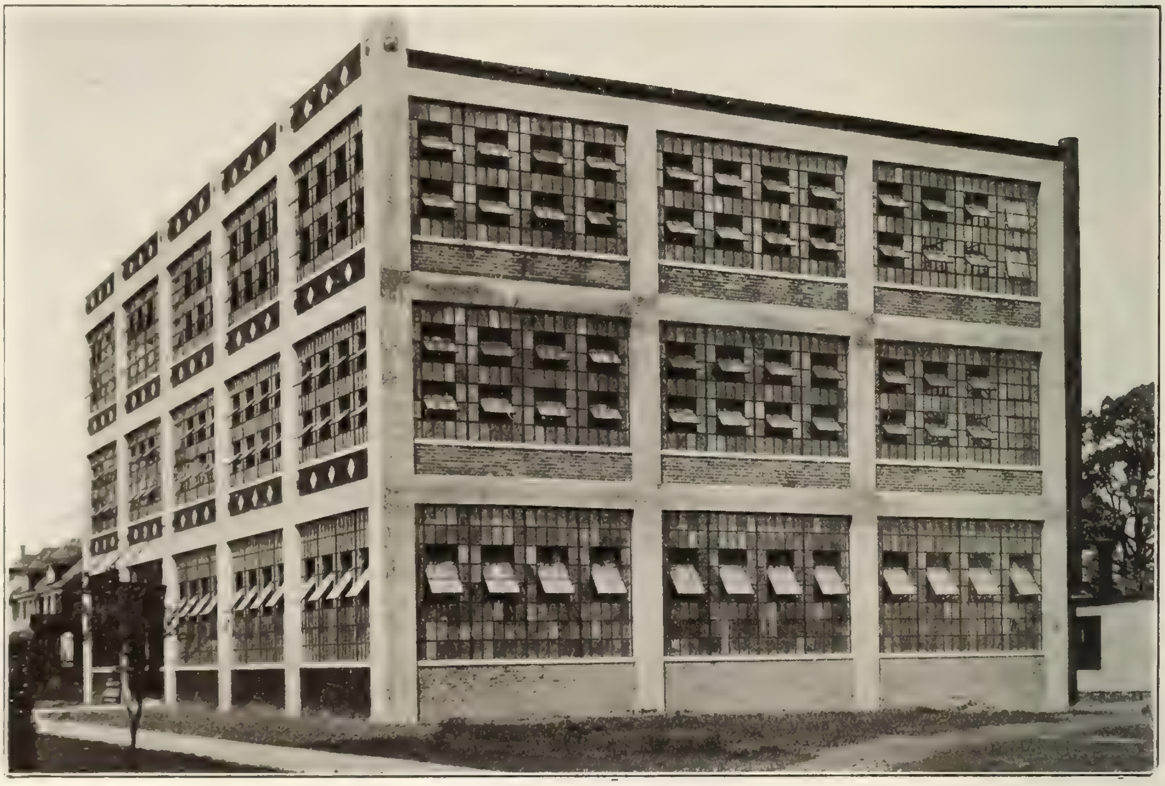
TORONTO - ONTARIO

LIGHT + VENTILATION — PROFITS

FENESTRA SOLID STEEL WINDOWS will provide your factory with an abundance of pure air; and light practically as good as that "out doors." Your employees will be able to do more and better work.

FENESTRA STEEL SASH not only increases production, but also reduces costs. Window upkeep expenses and artificial lighting bills are reduced almost to the vanishing point.

FENESTRA SASH is inexpensive compared with wooden sash, which is short lived and inflammable. It affords the minimum obstruction to light. It is attractive in appearance, strong and durable. Made to meet all conditions and sizes of window openings.



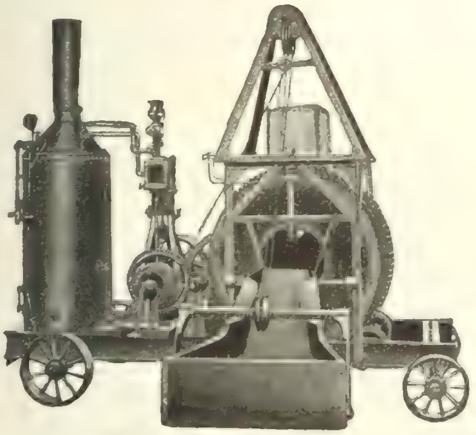
One of many buildings in Canada equipped throughout with "FENESTRA."

WRITE TO-DAY FOR CATALOG describing fully the merits of steel sash for all types of industrial buildings, large or small. FENESTRA has no equal for windows for foundries, power houses, factories, public buildings, machine shops, draughting rooms, railroad shops or any other buildings where the maximum light and ventilation are desired.

STEEL AND RADIATION, LIMITED

TORONTO, CANADA

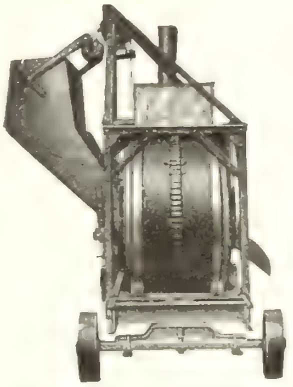
Concrete Mixers



Standard Drum Batch Mixer

SEVERAL KINDS and built in sizes to suit all classes of work.

The Many Improved features of the London Mixers have placed them in a CLASS BY THEMSELVES.



Standard Drum Batch Mixer

WE CAN SAVE THE CONTRACTORS MONEY.

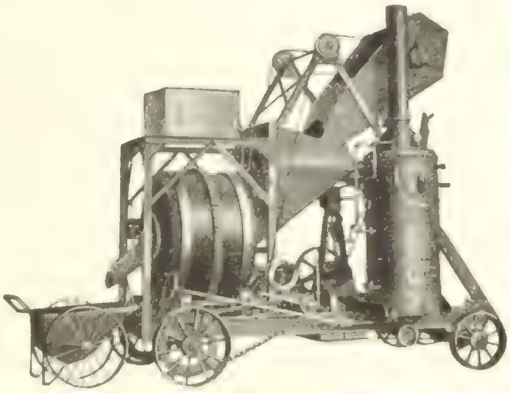
EVERY MACHINE MADE IN OUR OWN FACTORY.

On FIRST COST.

On COST OF MAINTENANCE.

On COST OF OPERATION.

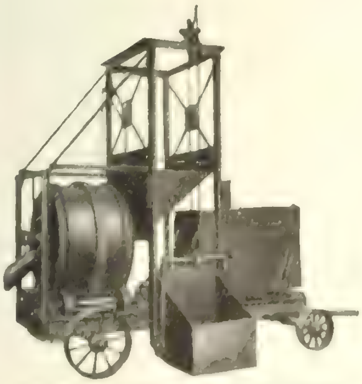
SEND FOR OUR CATALOGUE



Rear Discharge Paving Machine with Forward Loader

Our Machines are not made down to a price, but MADE UP TO A STANDARD.

By Manufacturing IN A LARGE SCALE we have been able to offer High Grade Machines AT REMARKABLY LOW PRICES.



Paving Machine with Side Loader

We manufacture a full line of Concrete Machinery and Cement Working Tools. Also a full line of Hoisting Engines and Contractors Equipment.

We are the Largest Manufacturers of Concrete Machinery in Canada.

No. 2 Automatic Batch Mixer

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

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CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
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REGINA, H. A. Knight
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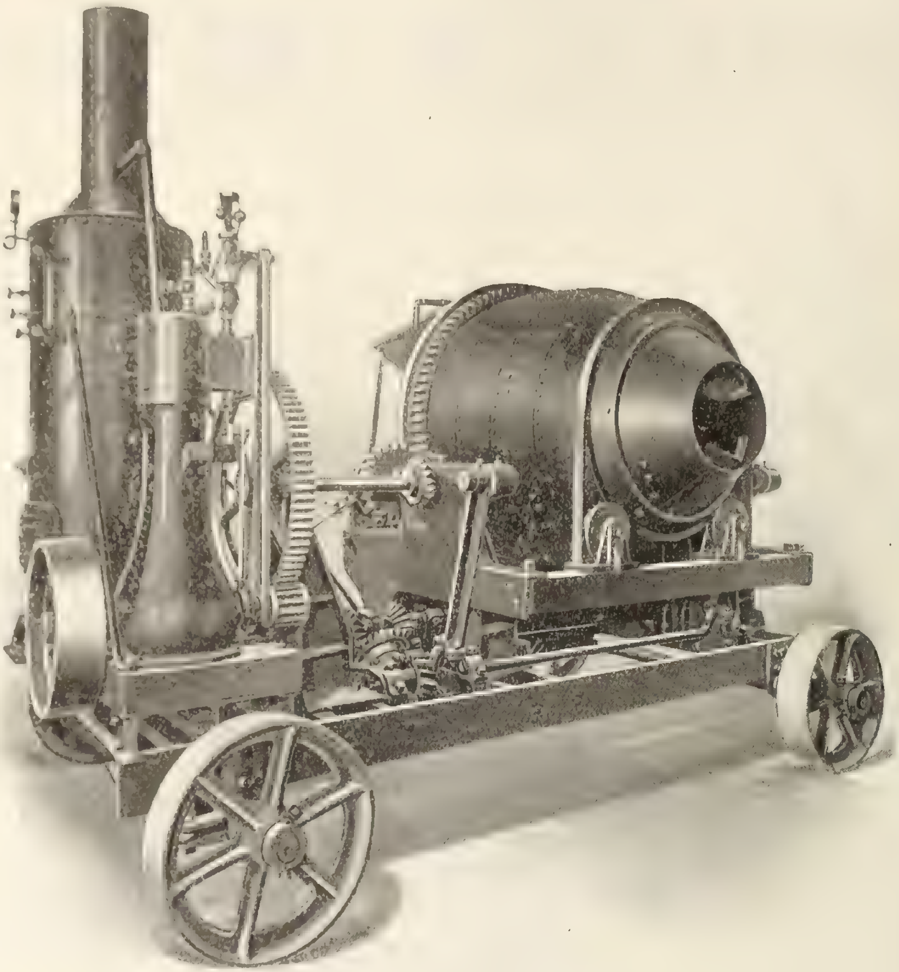
Low Working Cost



Rapid and Perfect Mixing

Maximum Efficiency

The Collossal Success of The Famous WETTLAUFER HEARTSHAPE MIXER

in 1912

is proof of its value to all contractors handling concrete work.

Our success will help make your success if you use a Wettlaufer Heartshape Mixer

in 1913.

See about it now. Send for Catalogue or come and see it working any time at

WETTLAUFER BROTHERS

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For Your Next Shipment of Cement, Order

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

ROGERS

Portland Cement

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

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Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone but cheaper.

"Steelcrete"

The perfect system of concrete reinforcement.

Full particulars on request orders filled from stock.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

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  Linde British Refrigeration Co.

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  Greening Wire Co., B.

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  Canadian Mineral Rubber Co.

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  Erie Machine Shops
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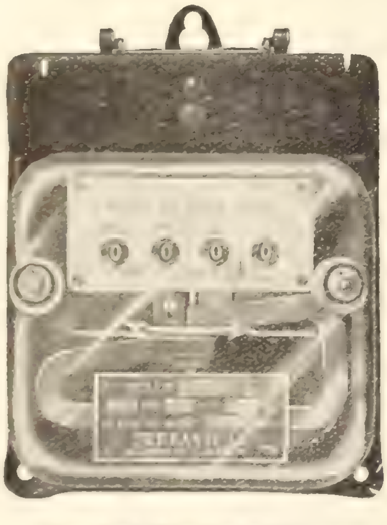
  Paterson Mfg. Co.

(Continued on page 14)

ACCURATE METERS

Ferranti



Glass Case Top Connections

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Steel Case—Top or Bottom Connections

The Ferranti Electrical Co. of Canada, Limited

TORONTO, 90 Sherbourne St. WINNIPEG, 56 Albert St.

The Real Belt Test is Actual Service

You do not care what tests a belt will stand unless it stands up under one—actual service.

The Sawyer Canvas Belt stands the hardest service in Brick and Clay Plants

This is one of the many classes of work to which Sawyer is particularly adapted. Whether you want a main drive, or smaller drive, or a large elevator belt, the Sawyer will do the work.
Write for our book "Stunts," which shows how others utilize Sawyer Canvas Belts.

Sawyer Belting Co., Cleveland, O.

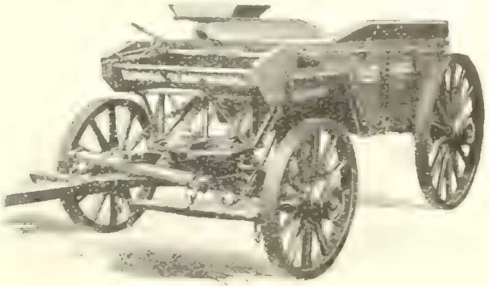
Busy Contractors Use New Model Aurora Dump Wagons

because they want wagons that will haul the most material in the least time and that are on the job every working hour.

A novel feature has been added to this wagon which places it beyond comparison with any other on the market, namely, **a steel channel filled with wood for the main side board,** giving unusual strength. This is the portion of the wagon that stands the heaviest strain. With this reinforced side board, breakage is practically impossible. It is short coupled and built low. Light in weight. **Write today.**

Western Wheeled Scraper Co.

Aurora, Illinois
Earth and Stone Handling Machinery



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS

Year	Cost	Year	Cost
1903	$ 0.00	1908	$ 93.26
1904	3.30	1909	200.46
1905	9.35	1910	14.07
1906	37.33	1911	2.29
1907	16.11		

Total $376.17 or $5\frac{2}{3}$c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.

Hagersville, Ont. Limited

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  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
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  Sackville Freestone Co.
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  Dominion Steel Castings Co.
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  Piggott & Co., Thos.

Tents
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  American Water Softener

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  Escher Wyss & Co.
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"PIONEER" Highest Quality ASPHALTS TRADE MARK

The 16 year record of "PIONEER" ASPHALTS is the best assurance an Engineer can have as to their efficiency, permanency and economy. Specify "PIONEER" ASPHALTS

For Asphalt Macadam Roads, Asphaltic Concrete, Sheet Asphalt Paving—and Filler for Brick and Block Pavements

and results will be highly satisfactory. "PIONEER" ASPHALTS are 99.5 per cent. pure bitumen. They are waterproof and weatherproof. Can be used for all purposes where an asphalt can be used.

Write for Specifications

THE CANADIAN MINERAL RUBBER CO., Ltd.
Canadian Express Building, MONTREAL 503 Canada Building, WINNIPEG

Barrett Specification Roofs

A Question and an Answer

February 27, 1912

[illegible] so for this reason I ask you to kindly send to me a specification that will be sure to fill my needs; I do not remove the tin if this is practicable

[illegible] Barrett goods."

(Signed) JOHN ARMSTRONG.

Thousands of owners have reached the same conclusion you have, namely that all roofings that need periodical painting, like tin and ready roofings, are unduly expensive to maintain. The way to avoid this is to give a copy of the Barrett Specification to your roofing contractor and secure prices on that basis.

The Barrett Specification is simply a formula requiring certain grades and quantities of material and specifying how the roof shall be laid. The Specification further states how the roof may be inspected to ascertain whether you have secured the required five plies of felt with continuous intervening layers of pitch.

If you order a Barrett Specification Roof and insist that the Specification be followed absolutely, you are certain of what you are getting. Your Barrett Specification Roof will never need painting and should give good service for twenty years or more without leaks and without a cent of maintenance expense.

Copy of the Barrett Specification with tracing ready for incorporation into your building plans [illegible]. Address nearest office.

Special Note

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If any abbreviated form is desired, however, the following is suggested:

ROOFING—Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified, and subject to the inspection requirements.

THE PATERSON MFG. CO., Limited

Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

ALPHABETICAL LIST OF ADVERTISERS

[illegible]	39
Ainsworth & Sons, William	
[illegible]	
[illegible]	19
[illegible]	89
[illegible] of Canada, Limited	
[illegible]	92
American Hoist & Derrick Co.	2
American Spiral Pipe Works	80
[illegible]	
[illegible]	24
Argenteuil Granite Company	
Armstrong, James C.	104
[illegible]	107
[illegible]	89
[illegible]	92
[illegible]	108
Batts Limited	
Beatty Bros.	
[illegible]	34
[illegible]	
Bennett, Robert	
Black Building Supply Co.	77
Blystone Machinery Company	107
[illegible]	104
Britnell & Company, Limited	98
[illegible]	92
[illegible]	103
[illegible]	82
[illegible]	98
Brodie & Company, James	
Buff & Buff Manufacturing Company	
Cabot, Incorporated, Samuel	
[illegible]	104
[illegible]	3
Canada Foundry Company, Limited	95
Canada Iron Corporation Limited	103
Canada Lifting Jack Company	90
Canada Steel Company	27
Canada Wire & Cable Company	27
Canada Wire & Iron Goods Co.	91
Canadian Boving Company	28
Canadian Bridge Company	100
Canadian Buffalo Forge Company	110
Canadian Fairbanks-Morse Co., Ltd.	111
Canadian H. W. Johns-Manville Co.	19
Canadian Kellogg Company	
Canadian Mineral Rubber Company	14
Canadian Office School Furniture Co.	85
Canadian Pipe Company, Limited	24
Canadian Ingersoll-Rand Company	1-22-23
Canadian Supply Company	82
Ceresit Waterproofing Company	91
Chain Belt Company	109
Chipman & Power	104
Christie Henderson & Company	
Clapham & Sons, John	
Commercial, The	
Conduits Company Limited	103
Consolidated Stone Company	
Consolidated Plate Glass Company	
Contractors' Supply Co., Ltd.	98
[illegible]	
Corinthian Stone Company	
[illegible]	
Crushed Stone Limited	83
Dake Engine Company	103
Dennis Wire & Iron Works Company	79
DesMoines Bridge & Iron Company	101
Dickson Bridge Works	
Dominion Bridge Company	100
Dominion Concrete Company	78
Dominion Creosoting Company	86
Dominion Ornamental Iron Company	
Dominion Marble Company	21
Dominion Sewer Pipe Company	20
Dominion Steel Castings Company	26
Dominion Wood Pipe Company	97
Don Valley Brick Works	7
Doty Marine Engine & Boiler Co.	36
[illegible]	40

Elaterite Paint Company	97
Engineering Works of Canada	88
Erie Machine Shops	85
Escher Wyss	93
Farmer, John I.	104
Ferguson, H. S.	104
Ferranti Electrical Co.	12
Foundation Company	105
Fraser, E. M.	104
Fuce & Smith	104
Galt Engineering Company, John	104
Galt Stove & Furnace Company	78
Gardner & Saxby	104
Gartshore, John J.	104
Gartshore-Thompson Pipe & Foundry Co.	102
Gandy & Company, L. H.	109
General Supply Company	28
Goheen Manufacturing Company	80
Goodyear Tire & Rubber Co. of Canada, Ltd.	37
Greening Wire Company, Limited, B.	
Gurley, W. & L.	93
Hagersville Contracting Company	13
Hancock, Jr., H. Syd.	104
Hamilton Art Glass Co., Ltd.	
Hamilton Bridge Co.	21
Hamilton Mfg. Company, Wm.	19
Hamilton Pressed Brick Company	87
Harvey, J.	85
Heinicke Company, H. R.	20
Hepburn John T.	31
Hobbs Manufacturing Company	84
Hopkins & Co., F. H.	112-32-33
Hotchkiss Lock Metal Form Company	83
Hunt & Company Robert W.	104
Improved Equipment Company	39
Imperial Wire & Cable Company	111
Inglis Company, John	21
International Marine Signal Co.	39-92
Jamieson Lime Company	88
Jenckes Machine Company	2
Jennings & Ross	84
Johnson, A. H.	
Jones & Glassco	38
Kennedy, James C.	104
Kerr Engine Company, Limited	
Koehring Machine Company	108
Laurentian Granite Company	85
Laurie & Lamb	96
Lautz Company	
Lea, R. S.	104
Lecky & Collis	17
Leonard & Sons, E.	83
Linde British Refrigeration Company	
London Concrete Machinery Company	9
Lundy Shovel & Tool Company	
Luxfer Prism Company	
MacLean Daily Reports	106
Mahan & Company	90
Marsh & Henthorn, Limited	78
McDougall Caledonian Iron Works Co., John	77
McDowall, R.	104
McKinnon Holmes & Company	96
McMillan & Sons, W.	90
McNeil & Company, William P.	102
Meadows, George B.	39
Metal Shingle & Siding Company	
Metallic Roofing Company	79
Miller & Company, Geo. M.	
Missisquoi Marble Co., Ltd.	92
Mitchell Company, Limited, Robert	100
Montreal Locomotive Works Limited	83
Morrison & Company	104
Munderloh & Company, Limited	
Mussens Limited	4
[illegible] Oakley	83

Napanee Iron Works	17
National Bridge Company of Canada	101
National Iron Works Limited	103
National Pipe & Foundry Company	102
Neptune Meter Company	101
Noble, Clarence W.	79
Northwestern Terra Cotta Company	97
Ontario Asphalt Block Co., Ltd.	89
Ontario Sewer Pipe Company	20
Ontario Wind Engine & Pump Co.	83
Ormsby Limited, A. B.	18
Oshawa Interior Fittings Company	
Owen Sound Iron Works	
Pacific Coast Pipe Company	1
Paterson Manufacturing Company	15-81
Pedlar People	35
Phoenix Bridge Company	97
Piggott & Company, Thomas	
Pinchin Johnson & Company	110
Power & Son	
Provincial Steel Company	26
Queenstown Quarry Company	103
Reid & Brown	104
Rhodes Curry Company, Limited	107
Rogers, Limited, Alfred	11
Roman Stone Company	30
Royce Limited	25
Sackville Freestone Company, Limited	34
Sand & Supplies Limited	102
Sarnia Bridge Company, Limited	101
Sawyer Belting Company	13
Sheldons Limited	18
Sheppard, James	99
Silcox, A. B.	
Slack & Company, T.	85
Smart-Turner Machine Company	1
Smith Limited, Thos. & Wm.	94
Smyth & Ryan	97
Standard Ideal Company	40
Standard Steel Construction Co.	101
Standard Underground Cable Co. of Canada	25
Stanley Company, W. F.	
Star Expansion Bolt Company	
Steel Company of Canada	26
Steel & Radiation	8
Stinson-Reeb Builders' Supply Co.	
Structural Steel Company	100
Sturtevant Co. of Canada, Ltd. B. F.	27
Taylor, J. & J.	
Thew-Automatic Shovel Company	36
Toledo Wheelbarrow Company	
Toronto Plate Glass Importing Co.	1-97
Toronto Iron Works	89
Trussed Concrete Steel Company	98
Tuec Company	
Turner, C. A. P.	
United States Steel Products Co.	29
United Typewriter	25
Urschel-Bates Valve Bag Company	90
Waterous Engine Works Company	109
Weeks, Arthur L.	104
Welch & Company, H. J.	104
Western Canada Contractor	98
Western Wheeled Scraper Company	13
Wettlaufer Bros.	10
Woodstock Wind Motor Company	99
Wood and Service	104
Wooliscroft & Son, G.	80
York Sand & Gravel Company	98

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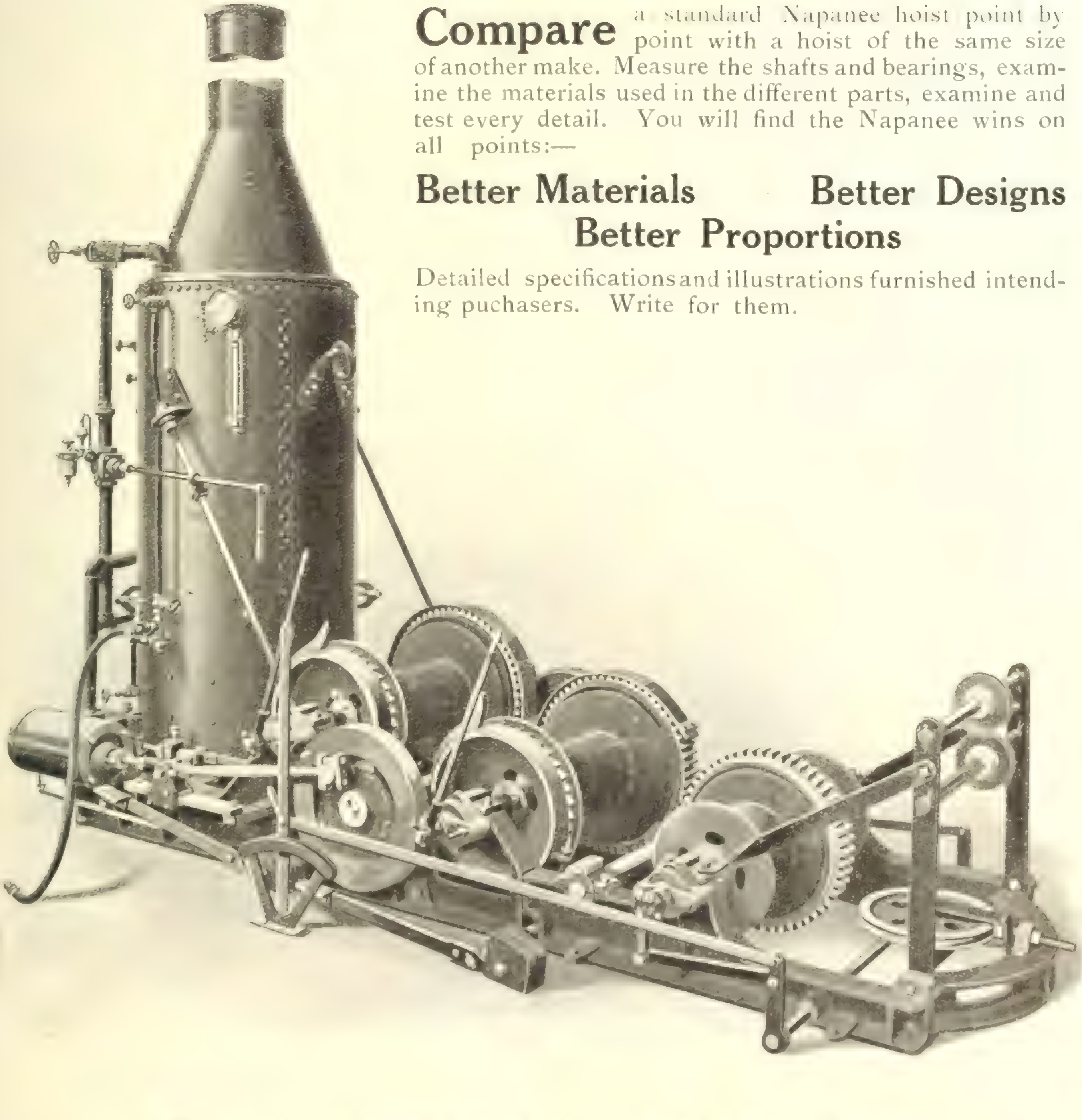

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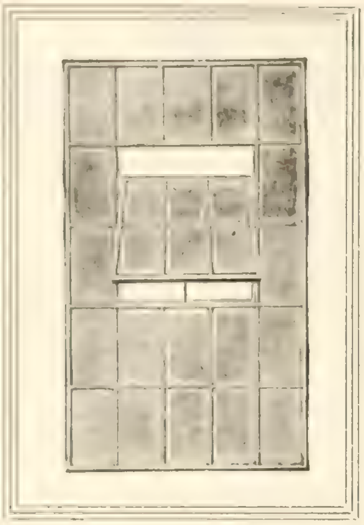

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The Ormsby-Lupton Steel Sash is unsurpassed for strength, durability, appearance, and convenient and easily operated ventilators.

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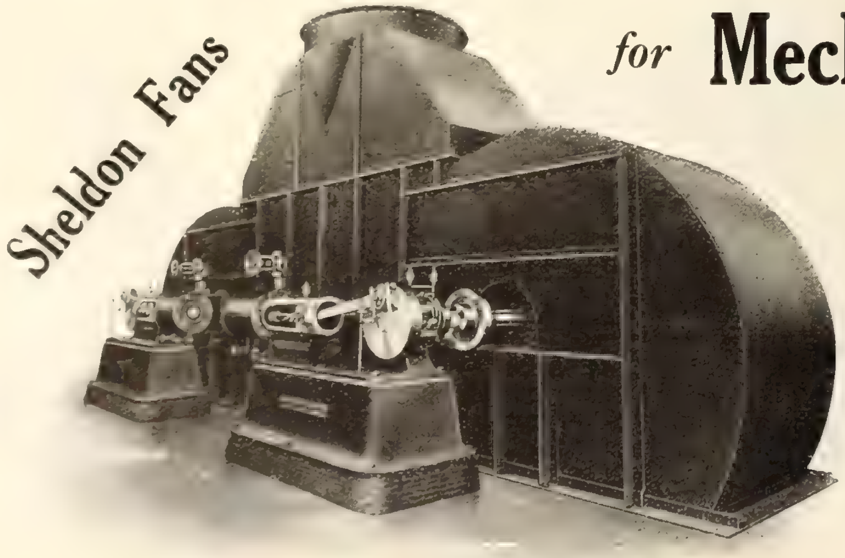

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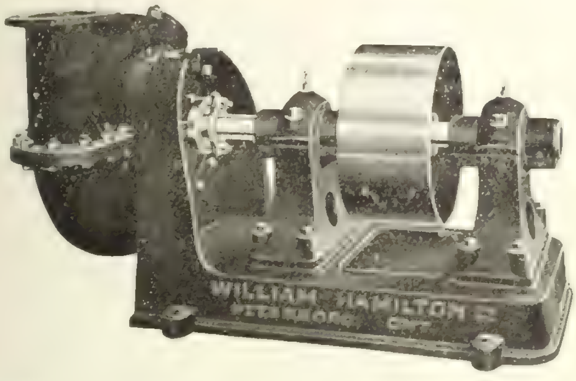

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There is also room enough between the pulley and bearings to prevent any oil dripping on the belt.

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Stuccos containing sand very often discolor, become mottled and stained, crack, crumble and flake off. This is due to the injurious foreign substances in the sand, which cannot be removed by screening or other means.

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It neither loosens nor falls off, it allows carpenters to follow plasterers without loss of time and lasts as long as the building.

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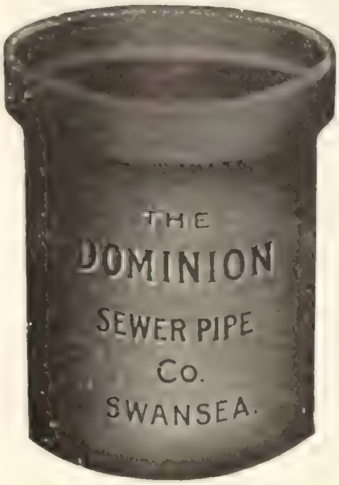

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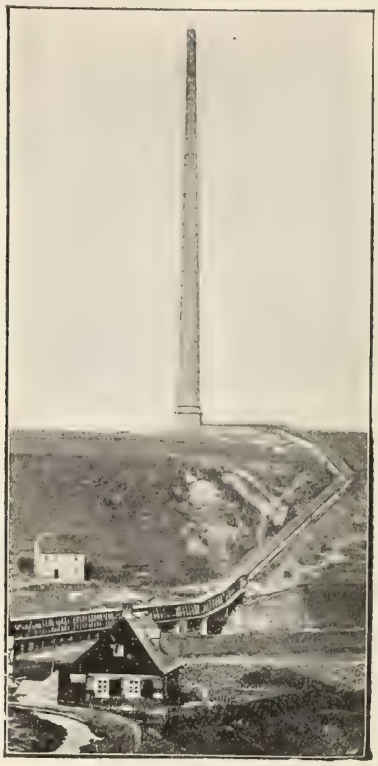

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Radial Brick chimneys are the only type that will not deteriorate from the effects of gases and erosion.

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will be found proving their superiority to over 4,000 users in every part of the country. The day of common brick and metal stacks is gone—if you are building a chimney make it a **HEINICKE.**

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Representatives for Canada:
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for All Sewer Work

and You Don't get the Best if You Don't Get " Mimico " Brand.

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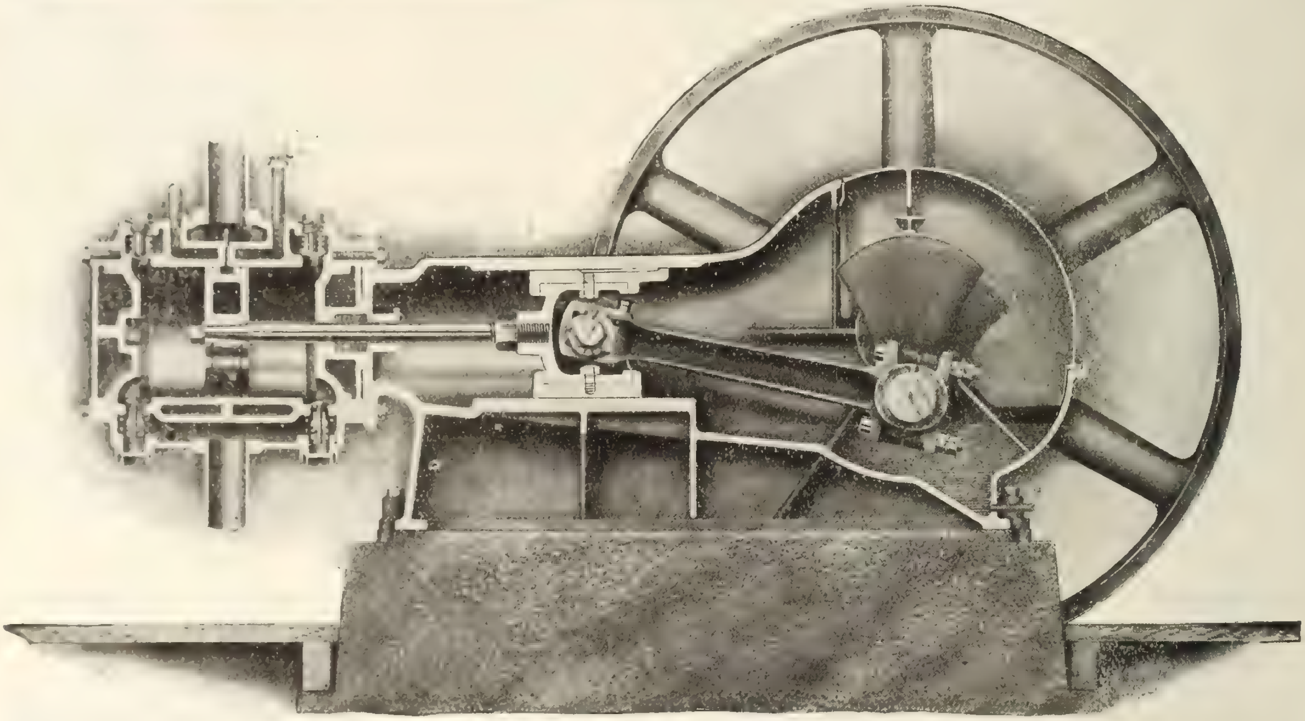
HAMILTON, CANADA

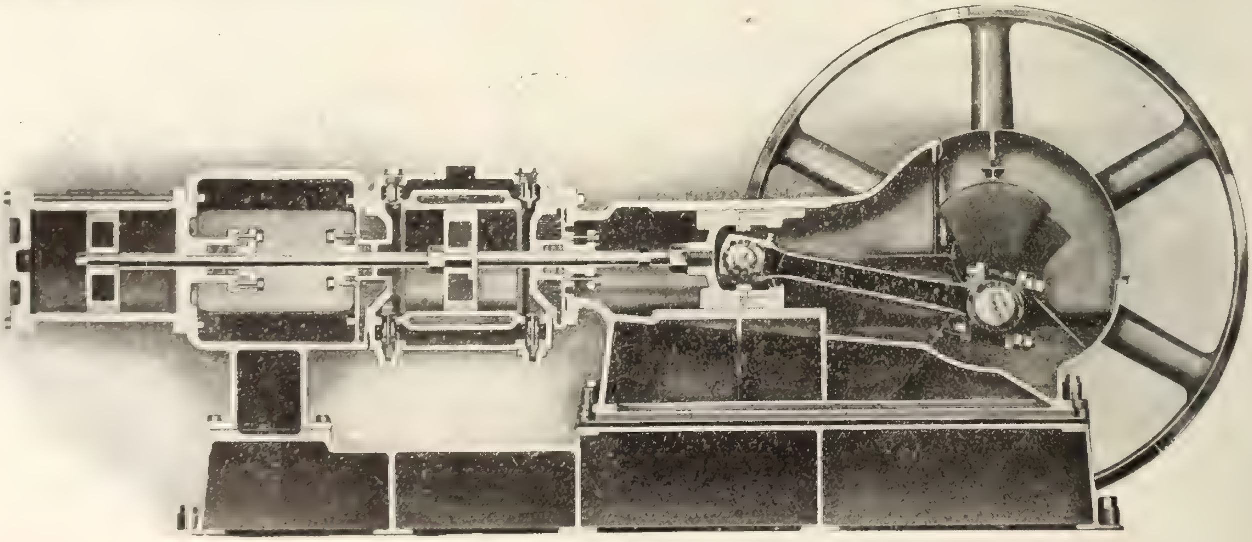
INGERSOLL-RAND STRAIGHT LINE
CLASS "N"
COMPRESSORS



Class "N E-1" Single Stage, Belt Driven Design.

Built in capacities ranging from 57 to 502 cu. ft. free air per minute for air pressures ranging from 15 to 100 pounds.

This machine was produced, in Canada, about two years ago, since which time hundreds have been supplied to the Canadian Trade.



Class "N F-1" Single Stage, Steam Driven Design.

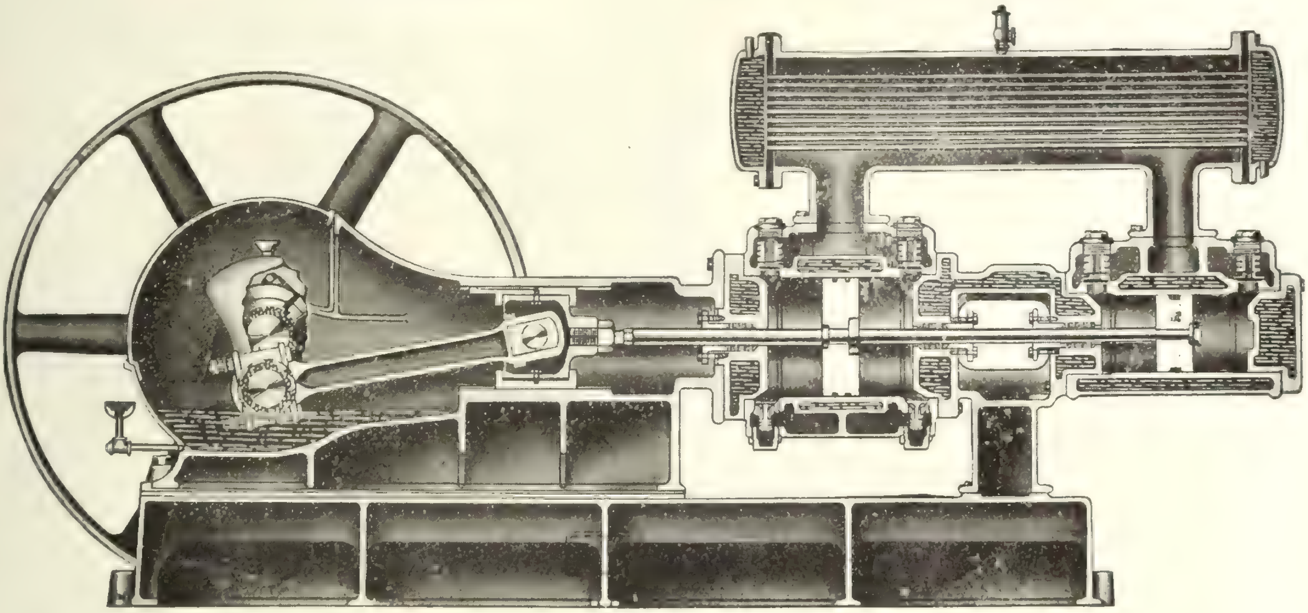
An extremely simple machine, with steam cylinder back of the air cylinder and equipped with belt wheel. This construction permits of disconnecting steam parts and driving by belt as in upper illustrated design.

Built in the same range of sizes as Class "N E-1."

THESE machines all embody many of the same desirable features inasmuch as the frames, crossheads, connecting rods, belt wheels and crank shafts are of the same design, but differ in size.

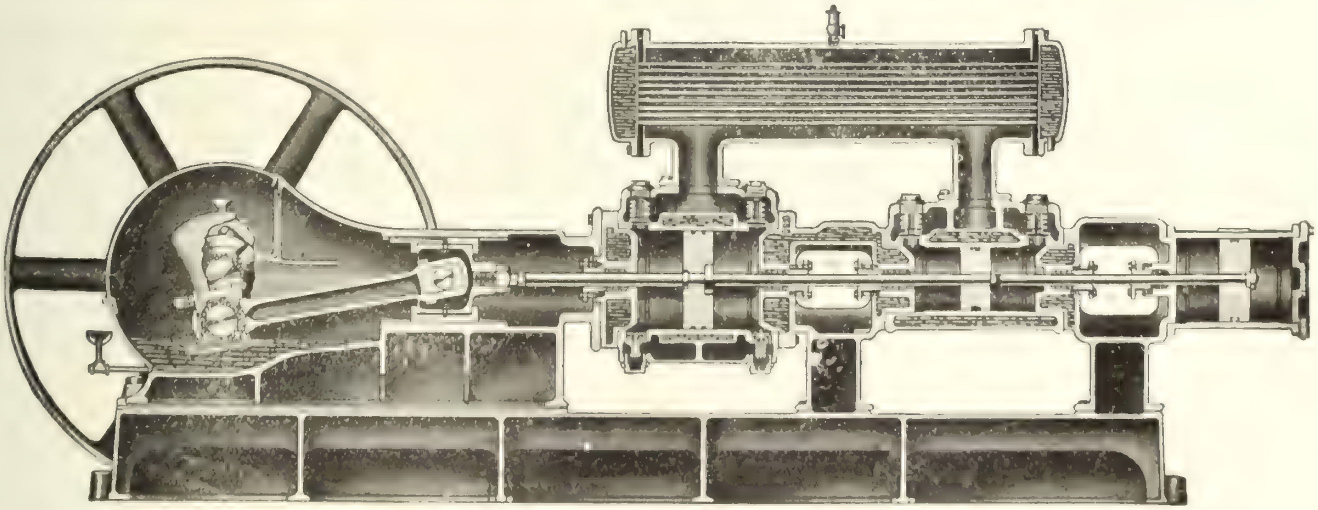
They are all of the enclosed, self-contained, automatically lubricated, sanitary, simple, rugged construction. Every possible provision is made for automatic operation, long life and high efficiency.

No other line of compressors on the market offer as many advantages as these Class "N" designs.



Class "N E-2" Two Stage, Belt Driven Design

These two stage machines have large efficient overhead Water Tube Intercooler.
Built in capacities ranging from 157 to 426 cu. ft. free air per minute at 80 to 100 pounds air pressure.



Class "N F-2" Two Stage, Steam Driven Design

This is the "N E-2" design with the addition of a steam cylinder. Like the "N F-1" this machine is convertible from steam to belt drive.

CANADIAN INGERSOLL-RAND COMPANY
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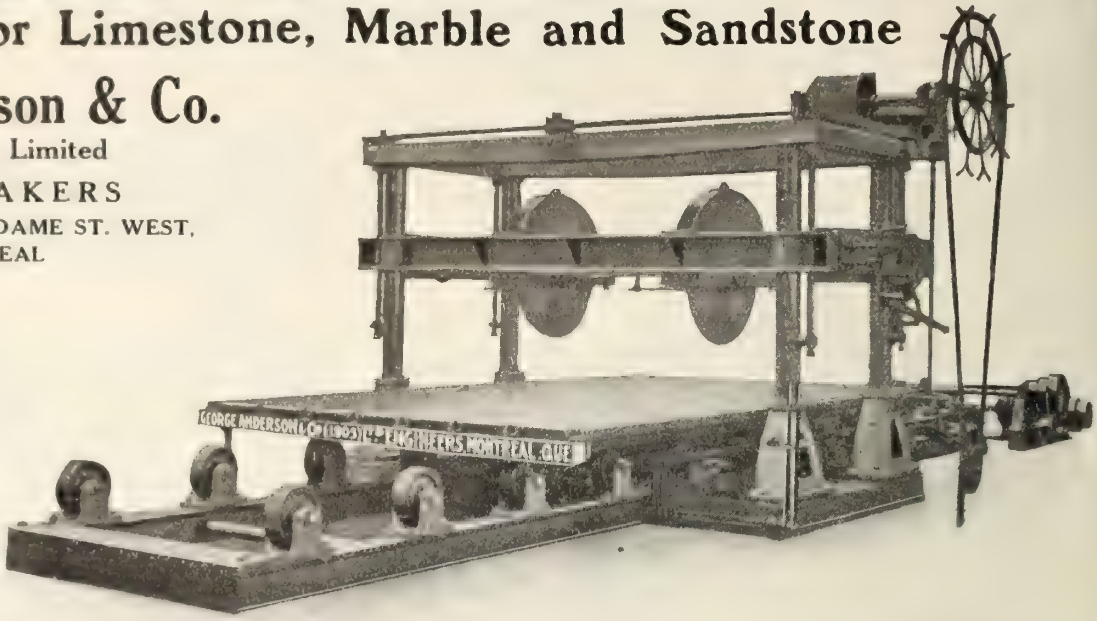

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Anderson's Rising and Falling Diamond Saw, made under British and U.S.A. Patents 209179, 657262 **SINGLE AND DOUBLE TABLES**

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Wooden Water Pipe

Galvanized Wire Wound and Continuous Stave Pipe for Water Works, Power, Irrigation, etc.

Withstands 250 lb. working pressure.

Not affected by Frost, Corrosion, Electricity or Acid. Water Works Systems installed. Prompt attention to inquiries.

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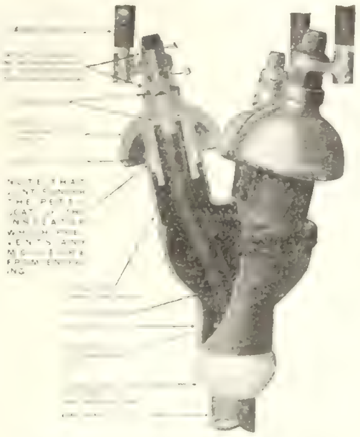
All Canadian Cities



Sectional view of 3-Conductor DOA Terminal for 2,500 Volt Service

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embody all the improvements suggested by over 20 years of service under varied and most exacting conditions. They were the best 20 years ago—they are the best to-day. A card will bring full information. *Write to-day.*

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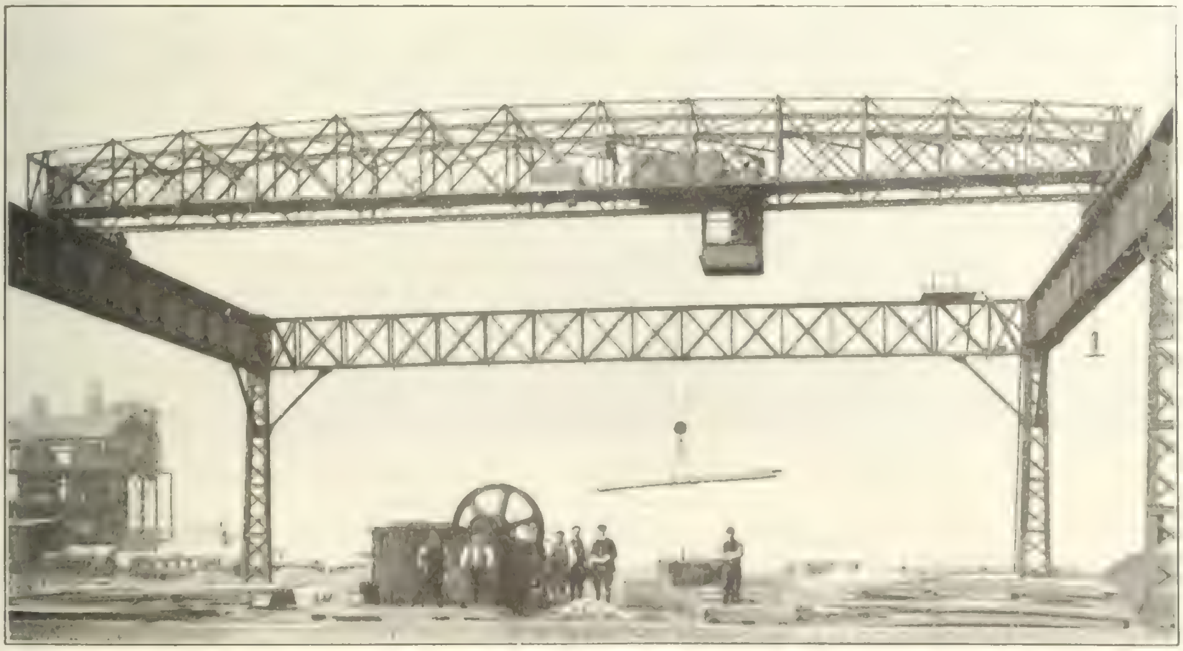

Yard Crane at Steel Mill of Sir Alfred Hickman, Limited, Bilston, Staffordshire

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Cranes
Capstans
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20 lb. Section Rails
25 " " "
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40 " " "
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60 Tons 25 lb. Rails, Ready for Shipment
500 " 30 " " "
70 " 40 " " "

We hold stocks of
20 lb. Fishplates
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MERCHANT BARS	ROUNDS and SQUARES	FLATS	ANGLES
	3/8 to 2-in.	3/4 x 1/8 to 4 x 1	3/4 x 1/8 to 2 1/2 x 1/2

Cold Twisted Squares for Concrete Re-inforcing made from New Steel Billets only.

Montreal Representatives: MERCHANT BARS, Gerald Lomer, Ltd., 43 St. Sacrament St. RAILS, F. H. Hopkins & Co Imperial Bank Chambers
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STEEL BARS
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Annual Capacity 12,000 Tons

Stock Process for Small Work
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For Reinforcing Concrete

Plain Rounds

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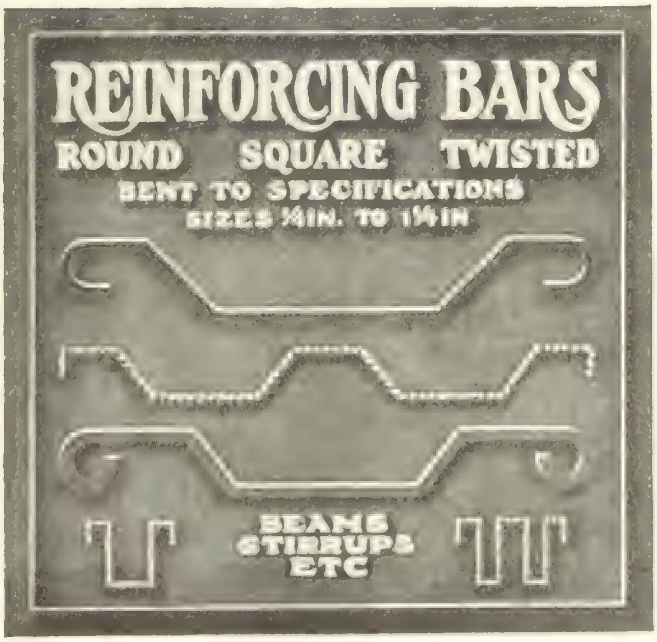
Cross Arm Braces, Plain and Galvanized.

We can ship from stock

Ask for prices—they will interest you.



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Angles from ¾ x ¾ in. up to 2 x 2 ins.

Round and square from ⅜ in. up to 1¼ ins.

Flats from ¾ in. up to 4 ins. in width, and other special sections.

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Sturtevant Propeller Fans

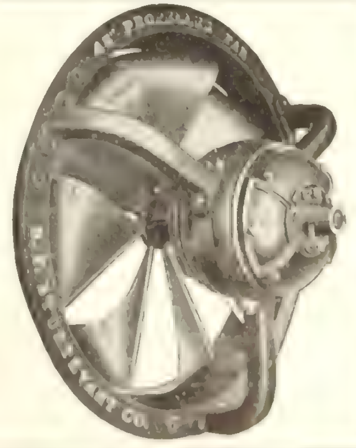
REG. U. S. PAT. OFF

For VENTILATING and COOLING

The design of our Propeller Fans is along the same scientific lines as all our fan product, and that is why Sturtevant Propeller Fans deliver more air for the same size fan and with less power expenditure than any other propeller type made. The construction is particularly strong and durable.

They will quickly change the air in factories, workrooms, kitchens, billiard halls, etc., carrying away the smoke, fumes, hot air, keeping the atmosphere sweet and cool.

The electric fans are equipped with motors wound for either alternating or direct current. *Ask for Bulletin No. 146 Z.*



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For High and Low Speeds

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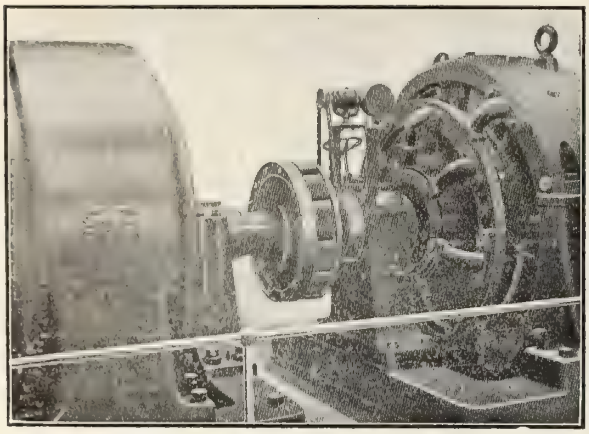

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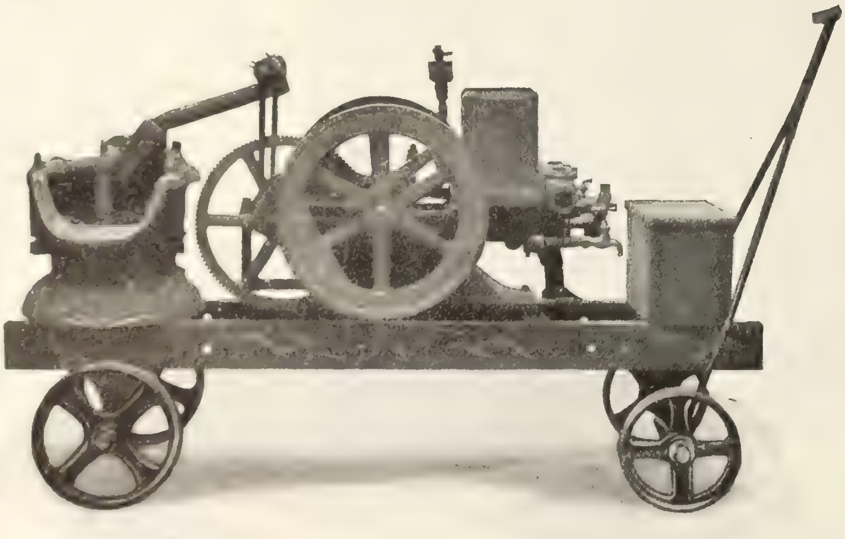

The Domestic Combined Gasoline Engine and Diaphragm Pump, as illustrated here, is the last word in the economical handling of water from cellar excavations, sewers etc., and is rapidly replacing the old style hand power, back breaking diaphragm pump, owing to its large capacity, simplicity and economy of operation.

CAPACITY 3″ SUCTION		COST OF OPERATION
3,500 gallons	per hour	2 cents
35,000 "	" day	20 "

Let us demonstrate this to you.

The General Supply Company of Canada, Ltd.

Ottawa, Ont. Toronto, Ont. Winnipeg, Man.

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TRIANGLE MESH
CONCRETE REINFORCEMENT

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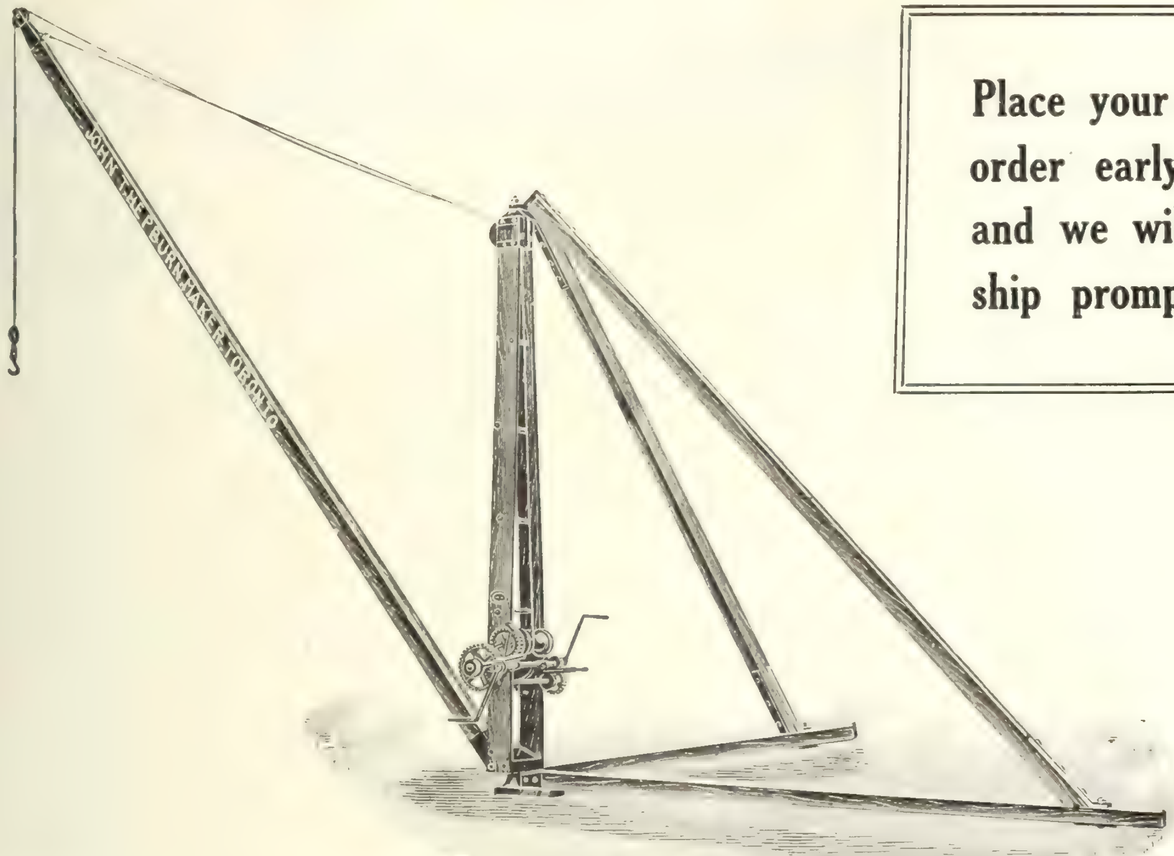
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If you cut the time upon a job and still do the job right, you are time and money in pocket. When you reduce labor by better methods and better equipment you also save time—and save money. You can get through more work, in less time, and at a better profit.

Hepburn Derricks represent bed-rock economy in construction work equipment.

They have weight where weight is needed. They have great strength. Yet every part is so well proportioned, so accurately and staunchly built, that a Hepburn Derrick is more easily operated and will do more work than any other derrick on the market.

Ask any man who has used them.

Made in standard sizes—one-half ton upwards. Interchangeable parts kept in stock for prompt shipment. Operated by hand or power. Fitted with single and double-purchase gears, band brake, and high-grade wire heaving rope. Interchangeable parts always in stock.

Iron Founder, Crane Builder and Machinist

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WE HAVE the following Second-hand Contractor's Machinery an Supplies to offer for immediate shipment, subject to inspection and acceptance before shipment and subject to prior sale.

We can assure you that it will certainly pay you to consider thi equipment, if you contemplate purchasing machinery or supplies of thi description. We will be pleased to provide you with further informa tion covering any material we list, upon receipt of request. Drop us line specifying the items you are interested in.

Item No.	Quantity	DESCRIPTION
		STEAM SHOVELS
1306	1	Model 60 "Marion" Steam Shovel, equipped with 2½ cubic yard dipper, on railroad trucks complete, Shop No. 1932, with complete stock of repair parts and extra fittings, also electric light outfit.
1307	1	"Vulcan" Steam Shovel, equipped with 1 cubic yard dipper, on traction trucks complete, weight about 45 tons, with standard boom and dipper, also special long boom and dipper handle for trenching.
1308	1	"Little Giant" Steam Shovel, equipped with 1¼ cubic yard dipper, on railroad trucks.
1309	2	Style A "Marion" Steam Shovels, equipped with 1½ cubic yard dipper, on railroad trucks.
1310	1	Model 40 "Marion" Electric Shovel, equipped with 1½ cubic yard dipper, on railroad trucks.
1311	1	Model 45 "Bucyrus" Steam Shovel, equipped with 1¾ cubic yard dipper, on railroad trucks, also fitted with electric light outfit.
		LOCOMOTIVES
1312	7	Locomotives, cylinders 18-in. x 24-in., weight approx. 55 tons each, complete with tender.
1313	2	Locomotives, cylinders, 16-in. x 24-in., weight approx. 40 tons each, complete with tenders.
1314	1	"Porter" Saddle Tank Locomotive, cylinders 10-in. x 16-in., weight approx. 18 tons, for standard gauge track.
1315	2	"Davenport" Saddle Tank Locomotives, cylinders 10-in. x 16-in., weight approx. 18 tons, for 36-in. gauge track.
		CARS
1316	2	Passenger Coaches, old C. P. R. Standard.
1317	1	Cookery Built on Flat Car.
1318	2	Flat Cars.
1319	1	Flat Car, with 5,000 gal. Water Tank fitted to same.
1320	63	Hart Convertible Cars, 35 cubic yard capacity.
1321	13	Hart Convertible Cars, 30 cubic yard capacity.
1322	1	Rodger Double Plow Distributing Car.

F. H. HOPKINS &

RAILWAY-CONTRACTO

Equipment
SALE

1323	4	"Koppell" Steel Dump Cars, 1 cubic yard capacity for 24-in. gauge track.
1324	6	"Peteler" Dump Cars, 4 cubic yard capacity, heavy duty, steel lined, for 36-in. gauge track.
1325	6	Section Hand Cars.
1326	5	Standard Push Cars.
1327	1	No. 4 Russell Snow Plow.
1328	1	Small Motor Car.
1329	1	No. 15 "Fairbanks Morse" Motor Car.

UNLOADERS AND PLOWS

1330	1	"Lidgerwood" Rapid Unloader, cylinders 12-in. x 12-in., 60 ton pull, mounted on special reinforced flat car, complete with canopy and ballast cable with necessary fittings.
1331	1	Class XI "Marion" Ballast Plow, Right Hand, for use with Hart Cars.
1332	1	Class XI "Marion" Ballast Plow, Left Hand, for use with Hart Cars.
1333	1	Class XII "Marion" Ballast Plow.

BUCKETS

1334	1	"Hayward" Orange Peel Bucket, 1 cubic yard capacity.
1335	15	Contractors' Buckets, 27 cubic feet capacity, with flaring sides.

PUMPS

1336	1	Combined Gasoline Engine and Pump, 10 horse power.
1337	1	Combined Gasoline Engine and Pump, 2 horse power.
1338	1	No. 5 B "Cameron" Steam Pump, 4-in. suction, 3-in. discharge.
1339	1	"Morris" Centrifugal Pump, 8-in. suction, 6-in. discharge, belt driven.
1340	1	"Northy" Centrifugal Pump, 12-in. suction 10-in. discharge, belt driven.
1341	1	"Beatty" Centrifugal Pump, 8-in. suction, 6-in. discharge, with direct connected engine.
1342	1	"American" Centrifugal Pump, 8-in. suction, 6-in. discharge, belt driven.
1343	1	"American" Centrifugal Pump, 10-in. suction, 8-in. discharge, belt driven.
1344	1	"Beatty" Centrifugal Pump, 6-in. suction, 4-in. discharge, belted to 5½ h.p. Ferro Gas Engine.
1345	1	Gasoline Driven Trench Pump, 3-in. suction.

CONCRETE MIXERS

1346	1	"Ideal" Concrete Mixer, equipped with Gasoline Engine, mounted on trucks.
1347	1	No. 0 Ransome Concrete Mixer, with Engine and Boiler, on trucks, with feed chute.
1348	4	No. 3 Ransome Concrete Mixers, with Engines and Boilers, on skids, with fixed batch hoppers.
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1350	1	Hydraulic Dredge Outfit, 10-in. suction, 10-in. discharge, "Morris," with necessary equipment.
1351	1	Dipper Dredge Outfit, cap 1½ cubic yard, machinery complete.

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Miscellaneous lot of small tools, such as jacks, shovels, steam drills, blacksmiths' tools, drills, rail saws, crowbars, hammers, etc.

In fact, we can supply almost any article which may be required on any construction work, as the equipment which has been turned over to us for sale is most complete in every respect.

CO., MONTREAL

ND MINING SUPPLIES

BEATTY HOISTS

STEAM OR ELECTRIC

Derrick Car placing 100 foot Deck Plate Girder Span in Missinabi River Bridge on the Transcontinental Railway. The Hamilton Bridge Works Co. together with many other prominent firms favor "Beatty Hoists" for this exacting work.

You cannot see the Hoisting Engine in the picture but it is there, ready at all times and equal to any work it is called upon to do.

This accounts for our receiving the larger portion of orders for engines used on this class of work.

We are equally well able to furnish YOU a Hoist fitted for YOUR individual needs.

May we send you new descriptive matter covering our Engines and Buckets, etc. We'll be glad of the chance.

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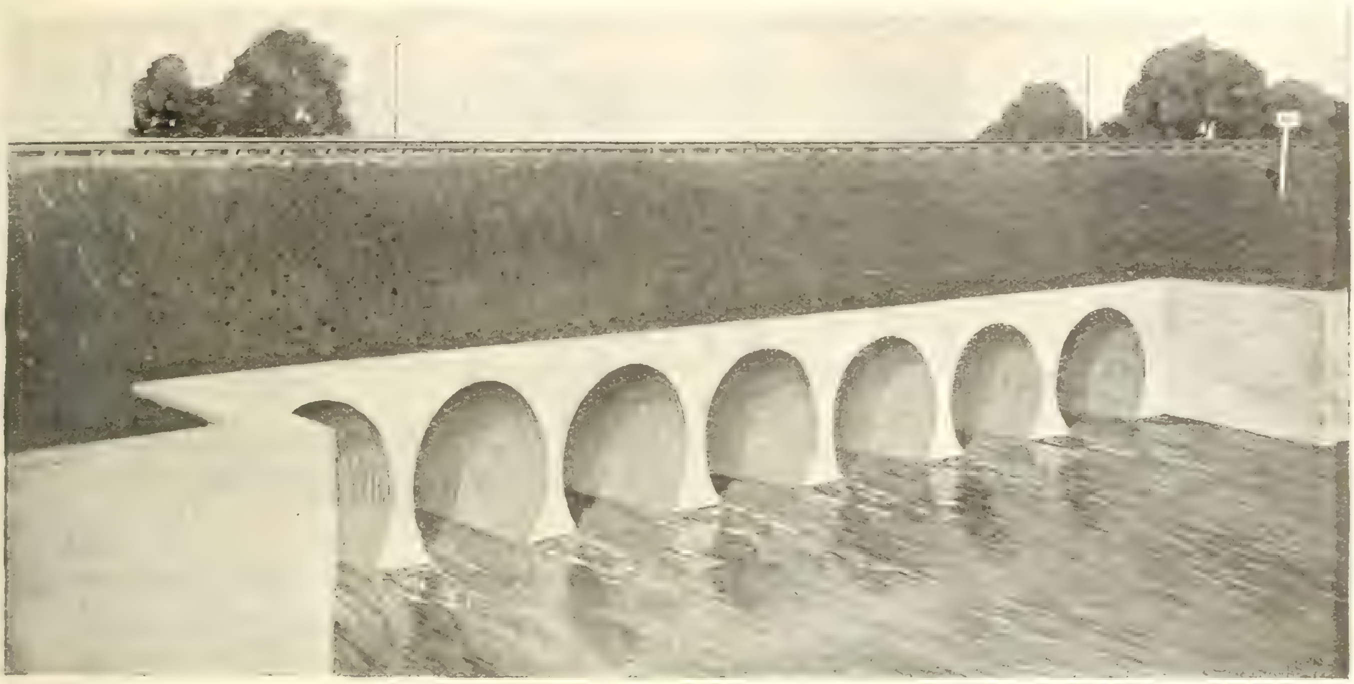

Pedlar Riveted Culvert for Railroad Use

WASHOUTS IMPOSSIBLE

Pedlar Riveted Culvert is made with narrow and deep corrugations, impossible to secure with steel in the heavy gauges used. The units of the installation are prepared in 36-ft. lengths at the factory and may be field riveted. Upon being placed, with a minimum of excavation, they should be tamped with the available filling material, which enters the corrugations and blocks water seepage or undermining. The up-stream ends of important installations may be protected with an apron of concrete, which is not subject to the shocks of traffic. The culvert receives the stresses of rolling loads, cushioned by the fill.

INSTALLATIONS of Pedlar Riveted Culvert may be used as permanent replacement of girder or truss bridges up to 60 ft. span over watercourses. The installation shown has a capacity of approximately 5,000 cubic feet per second. It carries the fill across the watercourse, and maintains the character of roadbed unchanged.

TONCAN METAL

is used exclusively in Pedlar Culvert—A homogeneous non-electrolytic metal which resists pitting and scaling, yet has the strength and elasticity to resist frost, rolling loads, etc., where concrete would fracture. The cost of this installation is approximately one-half that of a girder bridge with piers, and with maintenance cost in favor of the culvert installation. Send specifications for estimates.

Catalogue No. 600 on Request from Nearest Branch

The Pedlar People Limited

Est'd 1861

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MOOSE JAW, SASK., 202 Fairford St.
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Head Office and Works: OSHAWA, CANADA

The

Doty Marine Engine & Boiler Company Limited

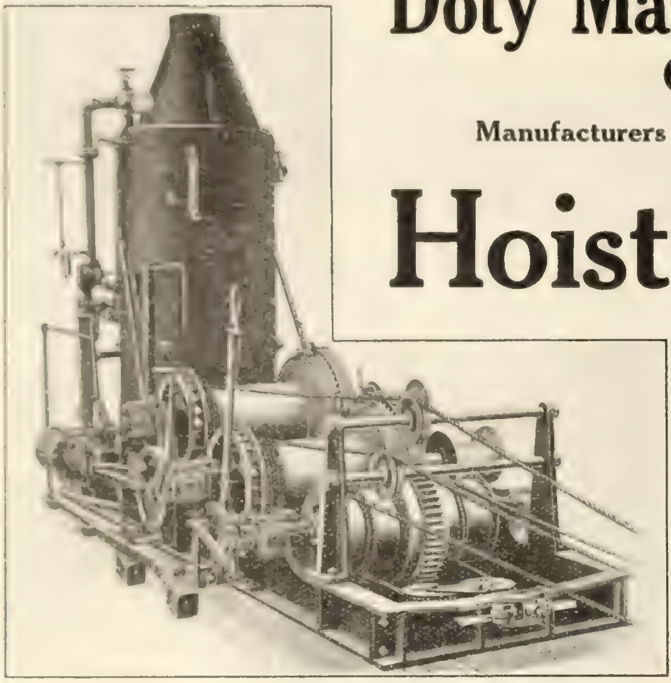
Manufacturers of Superior

Hoisting Engines

Derrick Swingers, Material Elevators, etc.

for

Contractors, Mines and Quarrymen



This cut illustrates our Standard Double Cylinder Double Drum Hoisting Engine with Derrick Swinger attached. "Superior to any other on the market." All parts constructed, guages and templates and every engine tested under steam.

A full line of Hoisting Engines, with Boilers to pass inspection in any province, kept in stock by The Doty Engine Works Co., Winnipeg, Man., and also at our

Works—GODERICH, ONT.

To buy our Engines is a Guarantee of Satisfaction

Save Time, Trouble and Money

By Using a

THEW SHOVEL

for that EXCAVATING CONTRACT

The contractor with men and teams cannot compete successfully with the man who owns a THEW SHOVEL.

THE REASON WHY

The smallest Thew does the work of from twenty to forty men at one-third of the cost. The Thew, being able to load a wagon a minute, will often save enough in team time to pay its entire operating cost, which means that you are loading dirt for practically nothing. Hand labor is difficult to secure, hard to hold and inefficient in practice, while the Thew is always on the job.

It will pay you to investigate this shovel. Write for our catalog, C. R. It will explain the numerous features which make the Thew the most practical and economical machine of its kind on the market and will give you valuable information regarding cost of excavating.

The Thew Automatic Shovel Company, Lorain, Ohio

A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

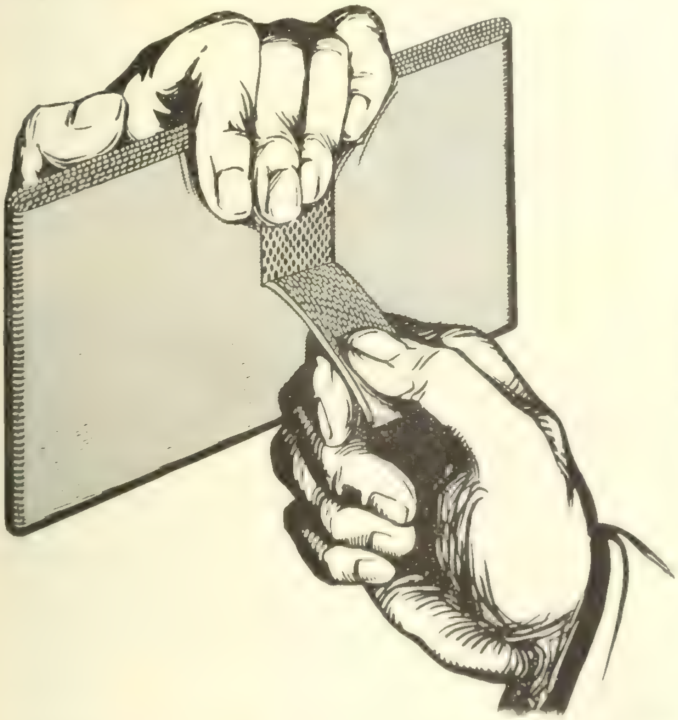
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard-twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit—and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS A TOTAL OF 72,000 FEET

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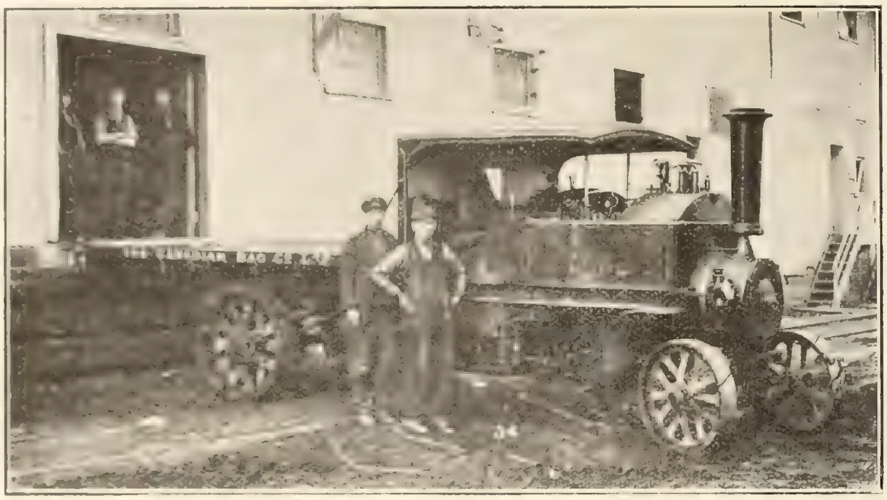

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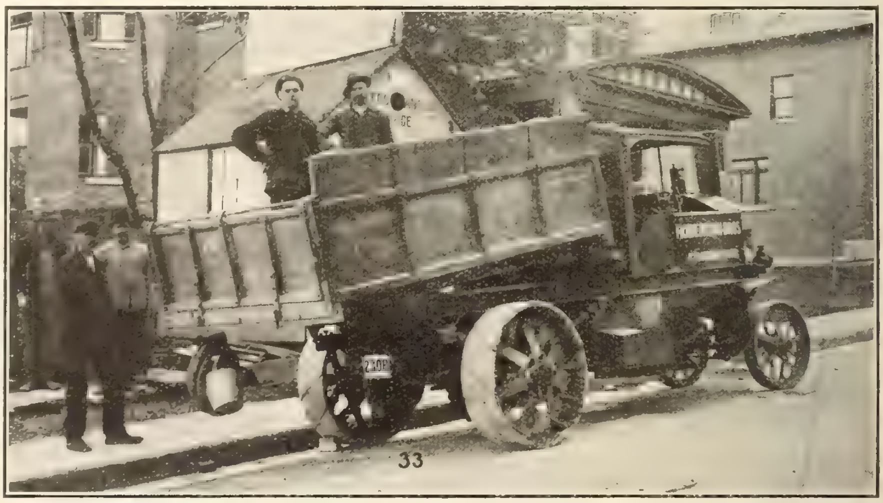

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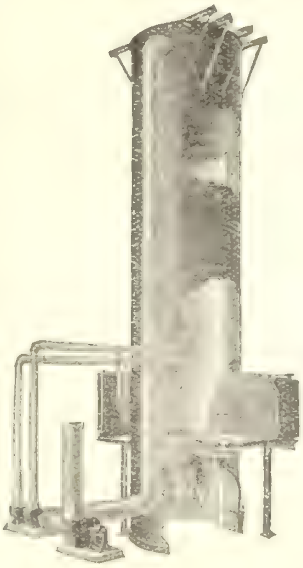

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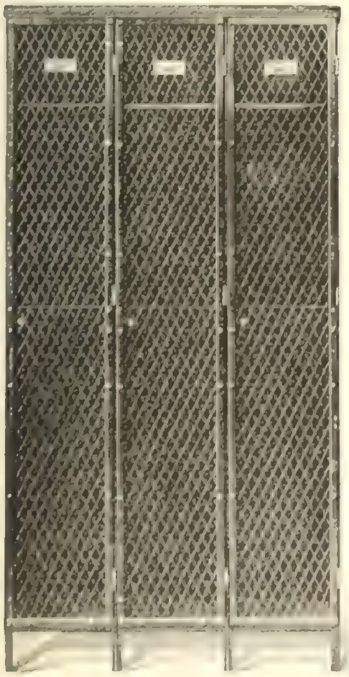

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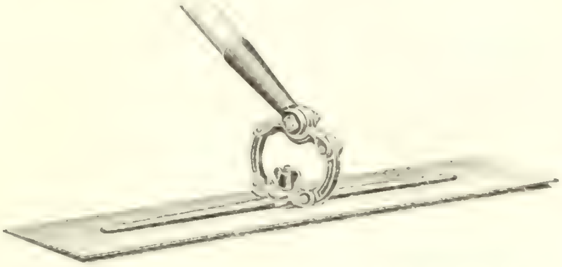

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ESTABLISHED 1886

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PUBLISHED EACH WEDNESDAY BY
HUGH C. MacLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
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LONDON, ENG. - - - 3 Regent Street, S.W.

SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 27 **February 5, 1913** **No. 6**

The Montreal Convention

Of every human being and of every human institution it is the easiest thing in the world to offer criticism. This axiomatic utterance is generally stated: "It's easy to criticise." The self-evident nature of the statement occurs to some of us perhaps sooner, perhaps later, but in any case, at some time or other, all of us realize that criticism is inevitable—for the reason that words are easier and cheaper than active effort.

And if the Canadian Society of Civil Engineers has arrived at that stage where it is under fire, it is in common with the lot of countless numbers that have preceded it—of countless numbers that will follow it. Each of us has his part to play, and if the reader, like the writer, is numbered in the ranks of those whose part contains more of onlooking than of acting, he may congratulate himself upon having the lines fall in easy places. Criticism is undoubtedly a good thing in moderation—indeed we could quote examples of where progress has been made in exact proportion to the amount of criticism forthcoming. To what measure this may apply to the Canadian Society of Civil Engineers we are uncertain, but certain we are that criticism was not lacking at the annual meeting of the Society held at Montreal last week. The Council was criticised, the membership was criticised, the usefulness and work of the Society were criticised—even the reasons adduced for the very existence of the Society were brought into question. Some of the criticism was of the kind that works havoc in an institution—the criticism that is put forward destructively and not constructively—rather with the idea of bringing the critic into prominence. Such critics do not appeal to us. Examples of this genus, unhappily, are becoming too common and we were heartily in sympathy with President Tye in reproving a member who, while lacking interest in the work of the special committee to which he had been appointed—as evidenced by the failure of that committee to submit a report—had had the temerity to attack the Council and the Society.

We listened to the various criticism, however, and came to the conclusion that much of it was not altogether out of place. We must admit that we were impressed none too favorably with the actual work of this national body. The Report of Council, for instance, reflects little credit—even though it be as long as the annual report of the C. P. R., as is claimed for it by President Tye. Apart from the lack of real achievement that it shows, it is ambiguous, and in many places the editorial work appears to have been done carelessly. We must confess that we are in agreement with the member who stated at the convention that he estimated a report not by its length, but by its contents. And in regard to the contents of the Council's report we might point out that out of twenty-six pages, eighteen are taken up with various lists of names and books, and four with the financial report. To our mind the Council of the Canadian Society made a poor showing. Perhaps this is not altogether surprising in view of the manner in which the governing body is constituted.

We are pleased to note the growing disposition on the part of the members to fortify the staff at headquarters by the appointment of a permanent secretary. This would appear to be a desirable consummation and one that would open up a greater sphere of usefulness for the society.

A word anent the proposal to establish a provincial section of the Society in British Columbia. We cannot see why this idea should meet with opposition from the Society; neither can we believe that such opposition will avail very much—for however strongly it may be developed it is certain that it will not overcome time and distance. In our opinion the British Columbia representatives have made out a clear case in favor of a strong local authority.

The Canadian Society of Civil Engineers has an honorable record, but it has not yet reached that stage where its mandates are final, and if by unwise opposition to western enterprise a division is caused in its ranks, it may lapse into comparative obscurity. Canada is universally recognized as one of the greatest civil engineering fields in the world and it is not reasonable to suppose that all operations whatsoever will be controlled for all time from the new headquarters of the Canadian Society at Mansfield street, Montreal.

The primary object of the British Columbia members in seeking to fortify themselves is to offset alien influence in Canadian engineering enterprises. Here, again, we must say that we are in accord with the west. There are innumerable instances where United States engineers of quite average attainment have been sent for, post haste, to design and supervise works that could have been carried out by scores of men in this country. Every time an outsider is engaged, the defence is put forward that he is an "expert." The time is approaching very rapidly when the word "expert" will lose serious significance. In any case, how can we expect to turn out experts in Canada if we refuse to entrust our own people with any responsible undertaking.

For the New Westminster Harbour Works, an enterprise entailing an expenditure of over four million dollars, a Seattle civil engineer—whose assistants are all United States citizens—was engaged recently.

With what result? Eighteen applications were sent in for the specifications and tenders, and only one tender was received, and the solitary bid was from a firm headed by a United States engineer! The explanation made to the City Council of New Westminster was that there were no Canadian contractors capable of handling a work of such magnitude. In reality, when the Canadian contractors saw the conditions under which they would have to place themselves they absolutely declined to consider the work. And it is in this way that United States engineers secure Canadian commissions, bring in their friends as assistants, and secure the award of the contracts for their own countrymen!

Examples of this kind are to be found in Eastern Canada as well as in the west. Many large plums in the field of the building contractor have gone across the border when there have been a round dozen of Toronto firms, alone, capable of carrying out the work. Happily there have been exceptions. As opposed to the course followed at New Westminster, we have the plans for the extensive harbor improvements at Toronto, involving an expenditure of nearly twenty million dollars, prepared by a graduate of the School of Practical Science.

In commenting upon this matter, we have no intention of saying harsh things about the outside engineers who secure these Canadian appointments. All of them show commendable enterprise in seeking out a new and promising field—and most of their records are creditable—but we do criticise the government and other authorities who have the placing of these appointments, and we criticise the Canadian Society for its weak-kneed attitude in this and other matters. Why would it be out of place, or undignified, to express an opinion in such matters? It is not long since one of the British engineering societies set aside a special sum for the use of its members in litigation with councillors. If British practice may be taken as a precedent, in so far as decorum is concerned, surely the Canadian Society may properly concern itself with things that are of vital importance to its members.

It would seem that the Society could do with new blood. Those who have directed its operations for many years would perhaps do well to give place to those who were more closely in touch with modern day requirements. Old time traditions should give place to enterprise and activity in this day of competition.

The Canadian Society of Civil Engineers may be performing its part, but there are those who have to be "shown." We, ourselves, must confess to Missouri.

The Evil of Competitive Bids

THE system of letting contracts by competitive bids is an old, worn subject of discussion, and one which seems no nearer to the solution than the time of the first beginning of the practice. There is no distinct record of the beginning, by the way, and it is possible that none of us living now will see the end of. Nevertheless, it is the most pertinacious practice possible to consider. Let us look at the situation as it is. A set of specifications are written. There are just as many indistinct rulings and ingenious pitfalls in the preface to the specifications as it is possible to contrive. This is usually put into small print, and the contractor gives it a hurried reading to see if there are any new clauses, hurdles or high jumps that he has to contend with. Then he reaches the actual outline of the operation. He has had experience in just this kind of thing, so he makes a guess at how much excavating will cost in a given locality. If he has done a great deal of work in that same locality, he will have some idea of the cost to him per cubic yard of excavation. If it is new ground to him, he begins to figure and stipulate on so much for earth excavation and so much for rock excavation, and this is the method by which he makes out the details, which when all added together constitute his bid on the work.

Now as a matter of fact, the figure that he estimates is founded for the most part on sound and pure guess work, and this applies to at least 98 per cent. of all the contracts that are let for buildings of every description. On the other hand, his guess work may not be so lucky and he will underbid the cost on one job just about as much as he overbids on another, so that if he is a careful man he will make an inordinate profit on one job to pay for the unexpected loss an another, and so in the stretch of a number of operations he comes out about even; and the years roll by and Mr. Contractor gets to be a grey-headed old man with bent form and halting step, and he has not accumulated a penny with which to get his shoes shined or his face shaved in his old age.

Now the whole system of letting building operations by competitive bids is just as bad in principle as it is possible to conceive, for the reason, that if jobs are always let to the lowest bidders it can ultimately mean nothing more or less than that the worst possible, or at least cheapest possible type of building is going to be produced upon any given set of specifications that it is possible to build. If the contractor finds that he has guessed a little too low on the foundation, he is going to see how he is going to catch up some of that underestimate that he put on the foundation, and so on through to the finish of the job. When it comes to the time that the plastering is done, there is the great stunt to catch even. When the job reaches this stage there has been a whole lot of underestimates for steel, for trimming blocks and for the thousand and one et ceteras that every job always calls for, and as a last resort he figures that the grand "getting even" has got to come out of the plaster. The part of the job which is exposed to the inspection of even the casual visitor is slipped and daubed and robbed of material until it is next to no good at all. If there is any finishing to be done on the outside, it is merely pasted or tacked on—anything to get off the premises to give the owner possession and to get the final payment collected, either with or without a deduction on account of the appearance of things in general.

Efficient Cost-Keeping a Practical Remedy

There is one practical remedy, which is in these last few years being developed to some extent, and which will doubtless be greatly improved upon in the near future, and possibly perfected into a rational working basis within the space of the next twenty-five to thirty years, viz., "The careful keeping of costs." Now there is absolutely no use of the reader, who may be a contractor, attempting to waive off this suggestion by saying that he knows exactly what his work costs, for in ninety-nine cases out of one hundred, he is simply and purely a guesser and does not know what a cubic foot of concrete costs him or what a cubic foot of brick work costs him, or what a square foot of flooring costs him in the finished job. He may assume a list of Trautwine's or somebody else's co-efficients of costs and apply them indiscriminately without reference to local conditions or the changes in the basic prices of labor and material, and come out somewhere near correct, but it is true that there are not more than one dozen concerns in any large community that even make a first-class bluff at keeping a correct and strict account of the costs of the job as it proceeds from day to day and hour by hour. The timekeeper it is true marks the attendance of the men who are at work on the job, their arrival and their leaving of the work, and this record at the end of the job makes the total cost of labor. Just how much that record could be changed depends primarily upon the honesty of the timekeeper, and secondly upon his intelligence, co-operating with the intelligence of the foremen of the various trades represented on the job. The invoices of the people who supply materials, together with the freight and haulage accounts, will foot up at the end of the job the total bill of materials.

But there is no offset to show the amount of waste, nor in fact any serious attempt at the shipping of waste as the job proceeds, and this list made up in the accounting room shows the results of either good or bad management on the job, as the case may be. As the contractor generally looks at it, it means so much money went out on a given job; it is charged to that job and the total of all the money paid out on it subtracted from all the money that is collected on it leaves whatever profit there may be on the job, or, vice versa, shows how much loss may have accrued.

By some of the leading lights in the construction engineering line systems of costs have been devised which are so perfect that with the experience gained in the first two or three stories of a big building the exact cost of the upper stories can be predicted in advance, and it is remarkable that the bids are submitted by the concerns who have developed their cost keeping systems to a science, that on a given set of specifications involving as much as one hundred thousand dollars, the only variation is in the percentage of profit which they add after all the costs are taken into consideration. That is to say, if all of them are figuring on a ten per cent. profit, the figures would all be within the small circle of $100. This has been done repeatedly, and in marked contradiction to this are the other bids compiled on the old guess work system which have fantastic figures ranging from six to seven thousand above or below the estimate of those who keep their costs carefully, to demonstrate the prevalence of that time-honored custom of considering the business of erecting structures of every kind as a game of chance, not as a well organized conscientiously controlled and carefully conducted business.

We are not prepared to recommend any one system of cost keeping, but no man may consider himself permanently in the contracting business who does not make his first duty to find the cost of the work that he is doing, so that he can just as carefully and just as certainly estimate his profit as he does any other item of the job, for he cannot stay in business unless he conducts it profitably. Correct cost keeping is the educational feature of the contracting business, which must be generally developed before it ceases to be the game of chance just described and becomes a business. Such education has merely started and those who first begin to practice cost keeping make the complaint that they are invariably underpaid on every job that they figure.

It is possible that in the future builders will realize that competitive building is just about the worst way to employ a man to put up a structure, and that they will be convinced of the impossibility of securing the services of an expert for nothing simply because he happens to make a long kind of a guess in figuring their work. When costs are so well understood that all bids will look very much alike, then the owner may employ that one of the bidders whom he considers to be the most efficient man who tenders to do the work; pay him the cost as developed by the calculation, add his ten per cent. or his twelve per cent., or whatever per cent. he agrees to work upon, or his fee for the job, if you please, the same as the doctor, the lawyer or an other professional his bid. The experienced and expert contracting engineer is in fact quite as important a factor as is the doctor or the lawyer, and his services are worth quite as much money or more. He is entitled to his pay, and it is quite possible that builders would prefer to have such a man relieved of the responsibility of the cost, which they have to finally pay anyway, to purchase for them, all inside of his correctly estimated costs, and pay for his services without the pellmell system of competition and passing the job over to the lowest bidder.

There are some big jobs which have been let after some such system as this, and they are becoming more numerous for the reason that more satisfactory work has been done in such cases than have ever been done under the old system of the "building game." The progress of the contracting trade of the building interests demands the study of this suggestion of cost keeping, directed to the getting away from competitive bidding just as soon as it can be accomplished.

The Bradford sludge disposal works in England handle sludge brought 5 miles by pipe from Frizinghall to the presses and grease recovery apparatus at Esholt. The works include 128 sludge presses, sixteen vats, each capable of purifying 6 tons of grease, a 1,000-ton grease storage tank, separators, and sludge boiling vats. The sludge, according to the "Surveyor," arriving at the receiving tanks, is lifted by compressed air to the boiling vats, heated by live steam and passed into three steel vessels, and thence to sludge filter presses. Each press contains forty-seven chambers, 3 feet square. The heating facilitates the filter pressing and renders the grease liquid. The grease and water from the presses are separated in tanks and the grease conveyed to purification vats, from which it is run into barrels or delivered to the storage tank. From 12 to 15 tons of grease worth $40 to $60 per ton are obtained each day.

A rather unique method of repairing a concrete wall surface damaged by freezing before setting, was successfully used in the case of a retaining wall on the Pennsylvania Railroad at South Fork, Pa. The patch has now stood over 15 months, and is apparently in as good condition as when placed. The faulty concrete was removed by a small hand pick to depths varying from 1 to 18 inches. The sound concrete exposed was carefully cleaned; steel dowels were driven into it at 6-inch intervals, and a light reinforcing mesh attached to the dowels. Forms were then placed for the face of the wall, the concrete thoroughly wetted, and the holes filled with a 1:2 mortar.

National Gathering of Civil Engineers

Montreal the Mecca of the Profession Last Week Upon the Occasion of the 27th Annual Convention of the C. S. C. E.

THE Twenty Seventh Annual Convention of the Canadian Society of Civil Engineers was held at Montreal, January 28th-30th. As usual, the meeting was representative of all branches of the profession and of every section of the country from Halifax to Vancouver. The chair was occupied throughout by the President, Mr. W. F. Tye. At the opening session some fifty members were present, this number being augmented later by upwards of one hundred, while the total number who registered during the meeting was in excess of two hundred and fifty.

The first business of the society was the nomination of scrutineers, which was followed by an interesting discussion of the Report of Council. Contained in the report was a copy of a letter sent last November to the Premier of Canada, the Premier of British Columbia, and the Ministers of Public Works and of Railways and Canals. In this letter, Prof. C. H. McLeod, on behalf of the Society and acting in response to communications from members of the society residing in Western Canada, protested against the selection of alien engineers for engineering positions that should properly go to Canadians and suggested that Canadian engineers be given every opportunity on public works. Two instances were cited in Prof. McLeod's letter—one being that of the engineer of the city of Victoria for the construction of water works, and the other that of the engineer of the provincial government in charge of the improvement of Strathcona Park, both of these positions having been filled by engineers from the United States.

Alien Engineers Provoke Discussion

This subject of employing alien engineers came in for more extended consideration at later meetings, but there was considerable discussion concerning it at the opening session. Strong requests were made by members of the British Columbia branches to prosecute the matter further. Mr. McNab criticised the apathy of the Council in contenting itself with sending a letter to the various governments and taking no further action. He asked the members to consider what it would mean if the conditions were reversed and the matter had to be taken up by the American Society of Civil Engineers in defence of United States engineers against Canadians. This brought a vigorous protest from Mr. T. R. Thompson, of New York City, a member of the Executive Board of the American Society of Civil Engineers. Mr. Thompson said that he felt it incumbent upon him to protect the interests of a large number of United States members of the Canadian Society of Civil Engineers. He deprecated any such action as the one proposed, and suggested the possibility of retaliation by the United States. There were hundreds of young Canadians occupying remunerative positions over the border. What would it mean if these were all thrown out of work?

President Tye made the reminder that the subject matter of the letter referred to appertained only to government work, to which Mr. McNab replied by criticising the ambiguity in mentioning the appointment of the city of Victoria.

At this stage the discussion of the report in general was proceeded with. Several members of the Society criticised the report as not being sufficiently illuminating as to the work of the Society. The report indicated lack of real usefulness; it showed that the membership was not taken sufficiently into confidence.

Reference to the usefulness of the society brought some caustic comments from Mr. J. A. Jamieson, of Montreal, who said that the Society occupied a poor standing in the community and that decisions respecting important engineering projects were arrived at by the authorities without reference to or consultation with the Society. The report was lacking both in volume and interest.

Mr. Tye came to the defence of the Council and said that the report was as long as the Annual Report of the Canadian Pacific Railway, whose business was far more extensive, and that it would be infra dig for the Society to press for representation in special enterprises.

Mr. Jamieson contended that the achievements of the Society were not sufficient to earn the appreciation of the public—a sentiment concurred in by Mr. McNab, who added that the report lacked not in length but in contents. The report of the Library and House Committee was cited as an example of inadequacy.

A number of members had criticisms to offer in regard to the Library. It was held to be insufficient to meet the requirements of the younger members of the profession. One member deplored the fact that the library at headquarters was available only from 9 to 10 a.m. on Sunday—a day that afforded engineers the best opportunity in the week for research purposes.

The research facilities available for members provided the subject for further discussion. Professor McLeod read the bulletin which covered this matter in which members were invited to send communications to the Secretary, who would forward them to the proper quarter. Mr. C. H. Mitchell, of Toronto, suggested that this matter be kept constantly before the members in the publications of the Society. Another suggestion was that the Society should publish annual lists of the various provincial government reports of engineering works. Mr. T. C. Irving, Jr., of Toronto, requested that copies of the Transactions of other societies be obtained for the various Branches of the Society. It was decided that this matter should be taken up by the incoming Council and by the Library Committee. A resolution was passed in favor of having the Library open for six hours every Sunday.

Following came some further remarks from Mr. H. H. Vaughan, of Montreal, regarding the work of the Society. Mr. Vaughan said that there had been a great deal of criticism as to their usefulness, but it was certainly not a function of the society to become prominent in public affairs. The speaker asked for suggestions and himself suggested that the sphere of the society's usefulness might be enlarged by the publication of a journal—although emphasizing the expense connected therewith and the difficulty of obtaining papers and contributions.

Mr. L. G. Robinson, of Vancouver, thought that the lethargy of the Council was the direct reflection of the lethargy in the membership. He urged the members to take a tonic and give evidence of a more active interest in promoting the welfare of the institution.

The financial statement for 1912 showed a total expenditure during the year of upwards of $70,000. This included items amounting to nearly $50,000 for the purchase of the society's new property on Mansfield street, and expenditure on the new building. The total receipts amounted to upwards of $61,000. The cash on hand and on special deposit is some $5,000.

Reports of Branches

Reports of the various branches of the Society were read and accepted.

The Victoria Branch reported a total membership of 62. This branch was organized on February 19th, 1912. The annual meeting was held on December 12th last. During the year two papers were read, one being "The Effect of Light on Concrete," and the other "The Protection of the Foreshore at Dallas Road Sea-Wall." The chairman of the branch is Mr. F. C. Gamble.

The Manitoba Branch, of which Mr. J. G. Legrand is chairman, held its annual meeting on December 5th last. Various meetings were held during the year and some half dozen papers were presented. The total membership is 175, and the Secretary of the branch is Mr. E. Brydone-Jack.

The Vancouver Branch has a membership of 143. Six meetings were held during the year and the annual meeting was held on January 13th last. The Toronto report was submitted by Mr. T. C. Irving, whose record was received enthusiastically. The Toronto Branch has a membership of some 250. The Ottawa Branch report showed a membership of 279

At a later session the Quebec branch report was submitted. The membership at Quebec is 62. The annual meeting of the Quebec branch was held on January 20th, 1913. The chairman is Mr. A. R Decary.

Tuesday Afternoon Session

At the afternoon session on Tuesday, January 28th, a new scale of fees was outlined by Mr. H. B Vaughan, who estimated that his scheme would add 12 per cent. to the funds of the Society, for operating expenses. Immediate action was debarred by the bylaw requiring a two-thirds majority for the passing of such a measure.

The usefulness of the Society was again the subject of discussion. It was urged that some effort should be made to strengthen the central association and appoint a permanent secretary.

Mr. L. G. Robinson, of Vancouver, in support of the statement that the Society was not representative of the engineering profession, said that at a recent meeting in Vancouver, three members in five minutes put down the names of forty practising engineers who were not members of the Canadian Society of Civil Engineers. It was a matter of simple proportion to get an approximate idea of the large number of practising engineers not yet included in the ranks of the Society.

The presidential address of Mr. W. F. Tye is given below, almost in full. Our extract was preceded by some remarks relating to the internal development of the Society, Mr. Tye remarking that the memberhsip now amounted in all to over three thousand.

THE PRESIDENTIAL ADDRESS

By Mr. W. F. Tye, Toronto

TRANSPORTATION is one of Canada's greatest problems; our country is of vast area, the distances are great, the population sparse, and the traffic light; making the mileage cost of railways high per head of population. On the other hand the growth of the country is and will continue to be rapid. A great problem is thus presented: how to build our railways that they may not be too expensive for our present requirements, and yet be capable of improvement to fit our future needs. Economics of Railway Location is, therefore, of even more than usual importance to Canada. The subject is so vast that it is only possible in such an address to touch its outer fringe; but it is so important to us all that even a few rudimentary remarks may be interesting.

While railways are built to serve the traffic requirements of the country, the immediate object of the promoters and builders is to make a profit, either on the construction or operation. This is undoubtedly true when built by private parties. When built by a government, it is with the end in view that the people may make money either directly through the operation of the railway, or indirectly by the reduction of rates. It is, therefore, of prime importance that the engineer, whether he be working for private parties or for a government, locate and construct the most economic road. The most economic road is not necessarily either the cheapest or most expensive, neither is it necessarily the one which may be operated at the least cost—it is in reality the one which is the most effective commercially or the one which will enable its owners to transport the largest amount of traffic at the lowest cost.

In order to ascertain that a railroad is most effective commercially, the features which underlie its commercial effectiveness should be understood. These are:—Gross Earnings, Operating Expenses, and Fixed Charges; and are of importance in the order named. Gross Earnings, which depend on the amount of traffic handled, is undoubtedly first. It is never advisable to build a railway unless there is or will be sufficient traffic to pay the operating expenses and the fixed charges, no matter how cheaply or how well it can be built.

In new countries, such as most Canadian railways are built through, there is rarely sufficient traffic in sight to justify the construction of a road, so the promoters—whether they be a government or private parties—must have faith in the project and must be able to justify to themselves, and to the investing public, the possibilities of paying dividends.

Engineers are sometimes, though rarely, consulted in the early stages of the project to report on the traffic possibilities of the route. The usual way is for the promoters to decide for themselves that a road between certain terminals is commercially desirable, and that there is or will be sufficient traffic on such a route to justify its construction. Engineers are then employed to survey and construct the road. The question should at once arise with the engineer—how the railway can be so located as to make it the most effective commercially, or how to get for the promoters the most profitable traffic. No matter how this problem is stated, it finally resolves itself into this:—if the promoters be private parties, how can the road be so located and built that the most interest can be earned on the money invested—or if a government, to transport the most traffic at the least cost. The answer to either case is really the same, for, if it is so located that it may handle the most traffic at the least cost, it will, if properly managed, make the most interest on the money invested.

The first problem the engineer has then to solve is how he can so locate the road between the given terminals as to [illegible] profitable traffic. The route which takes in the greatest number of towns, or which goes through the best [illegible] of the country if unsettled, should be the first examined. A mistake frequently made is to locate the road within a mile or two of an important town in order to decrease the distance or avoid expense. The cost of handling traffic is the total cost from the door of the consignor to the door of the consignee, and rates on that basis must be equal. The added charge for cartage is at times so large as to wholly [illegible] the [illegible]ly placed line and give it to a competitor more favorably situated, or if it be not wholly destroyed, the additional cartage and delivery charges eat up the profits.

Where traffic is light, and train loads less than the rated capacity of the locomotive, the cost of handling additional traffic is much less than is the ordinary train mile cost. It should be figured in equating the value of a change in location which increases traffic at 50 per cent. of the usual value mile cost. In this respect it should be remembered that deviations from the direct route do not always materially add to the length of the line.

In order to locate a railway so that it may be commercially effective it is first necessary to know what the volume of traffic is likely to be, whether it is immediately available, and at what rate it is likely to grow. The best way to ascertain this is by comparison with roads through the same or a similar country. A road through a country most nearly approximating that to be traversed should be selected for examination, and its traffic for previous years studied. If, for any reason business is likely to be materially greater or less than on the road under examination, due allowance should be made.

All railways are now required to make yearly reports to the government, and such statistics should be examined as well as those published in the Railway Companies' Annual Reports. The average train load and the ruling grade should be studied, and finally the average number of trains per day should be ascertained. It must be remembered that though the traffic is rarely balanced, that is, that there is seldom as much tonnage moving one way as the other, the number of trains each way must within narrow limits be the same. It is not always easy for an outsider to ascertain the number of trains over any given railway, as railway statistics are not published in this form, but every effort should be made to arrive at it as closely as possible.

Having obtained this information, and having determined how the traffic on the proposed road will compare with that on the road under examination, some approximation of the ruling grades on the road in view should be arrived at. If different from those on the route with which comparison is being made, the number of trains per day each way on the proposed road should be increased or diminished accordingly.

While this method of ascertaining the number of trains per day is only approximate, it is certainly much more accurate than to attempt to make an independent estimate of the gross tonnage on the new road. The rate of growth of traffic should be similarly ascertained, as a railroad should be built not only to take care of the present traffic but also that of the road in the reasonably near future.

Cost per train mile is the basis of all economic comparison, as the effect of the number of trains on the cost [illegible] operation is much more direct than is the actual tonnage handled. The cost per train mile should thus be ascertained with reasonable accuracy. The Annual Reports published by the railway companies usually give these figures, if [illegible] the reports of the Inter-State Commerce Commission give this information for every railroad in the United States. From this mass of statistics the train mile cost of the most nearly similar road should be taken and assumed as the train mile cost of the proposed road. It must also be remembered that these costs are increasing rapidly, the average for the whole United States for the year ending June 30th, 1896, being 95 cents, while for the year ending June 30th, 1910, it had increased to $1.49.

Importance and Value of Proper Reconnaissance

Equipped with this information as to the sources of traffic, the estimated average number of trains per day, and the probable cost per train mile, the engineer is ready to make a reconnaissance of the country to be traversed. The reconnaissance should always be on an area rather than a line. An area wide enough to take in any possible line should be examined. All combinations of probable lines should be made showing the details of the topography by contours ten to fifty feet apart; the elevations of controlling points should be shown with the greatest attainable accuracy. From such a map carefully prepared all lines and combinations of lines can be studied. Approximate condensed profiles can be drawn, and distances, grades and costs can be approximately ascertained. With such information, the choice of routes can usually be narrowed down to one or two, or in rare instances to three lines over which it is necessary to run surveys.

The value of a proper reconnaissance cannot be too strongly insisted upon. It is owing to the lack of it that the graver errors of location are usually due, such as the selection of an improper route or ruling grade, passing of traffic centres, etc. There is no way in which money can be so profitably spent. Great pains should be taken to secure the most expert engineer for this class of work. In engineering and economic importance reconnaissance far outranks location or construction. It is not an exaggeration to say that for every dollar which an engineer can save on construction, he can save five on location, and ten on reconnaissance.

Ruling Grade the Essential Factor

The really essential factor in a location made for freight traffic is the ruling grade. The maximum is not always the ruling or limiting grade, as it might be operated by the aid of a helper engine, in which case it may not limit traffic. A very long grade of a lower rate may, by taxing the boiler capacity, become the ruling grade instead of a shorter steeper one. To ascertain the economic value of any change in grade, or to compare two different grades, the number of round trips per day required to handle the given or estimated traffic should be ascertained. The difference will be the saving in the trains each way per day. This multiplied by the ascertained cost per train mile, by twice the length of the Division in miles and the number of days in the year, will give the nanual saving. Capitalizing at the proper interest rate will give the capitalized value of the better grade. If the additional cost is not greater than the capitalized value when properly equated for distance, rise and fall, curvature, etc., then the lighter grade is an economic one, and should be adopted.

As many items of expense will not be affected by changes in the number of trains, the saving per train mile for a train eliminated is not as great as the cost per mile for the entire traffic. The saving is in reality in the neighborhood of fifty per cent., and this percentage of the ascertained total train mile cost should be used in estimating the economy due to a difference in ruling grade.

In figuring on the economics of a grade reduction on an old road where the traffic and the average number of trains per day are known, it is essential that the actual loads hauled by each locomotive be determined and compared with their rated capacities. This difference is due to the inability of the operating officials to get perfect results. This "personal equation" must be taken into consideration in figuring the number of trains per day with the new grades, as they will no more be able to get the best results under the new conditions than they were with the old. In making a reduction from a high rate to a low, for instance, from a 1 to a 0.3 or 0.4 per cent., it must not be forgotten that the proportion of the actual loads to the theoretical rating will be lower on the low grades than on the high. Time is an essential factor. On a 1 per cent. grade in good weather, the actual loading may usually be made 90 per cent. of the theoretical, while on 0.3 per cent. it is unlikely that more than 75 per cent. of the rating can be hauled if time is to be made.

The proportionate amount of ruling grade on the Division has also an important bearing on the loading of trains, the greater the proportion its length bears to the length of the Division the lighter the actual train loads must be, and this too must be taken into consideration in determining the average number of trains per day required to handle the traffic on the proposed new grade.

Serious error would undoubtedly arise if the theoretical number of trains required to handle the traffic on the proposed new grade were compared with the actual trains on the present one.

Concerning Fixed Charges

While Fixed Charges—which are largely determined by the "Cost of Construction"—are of lesser consideration than operating expenses, they are still of prime importance. No road can pay dividends to stock holders, or afford to reduce freight rates until its fixed charges are met. So it is of the greatest importance that the engineer introduce no features that will increase the cost of construction without reducing the operating expenses by at least as great an amount as the interest on the added cost. The cost of moving a given tonnage being the sum of the operating expenses and the fixed charges—it follows that a reduction in the cost which does not increase the operating expenses is only of less importance than one which reduces the operating expenses without increasing the cost. Such a reduction in cost is a practical improvement to the standard of the road, as it increases the margin between receipts and expenditures, and so permits of an increase in dividends, or has a tendency to permit of a reduction in freight rates, if that be the object aimed at.

In Canada most of the new construction is through districts which at the time of completion furnish but little traffic; much railway has been built on which the traffic did not justify even one daily freight train per day each way. It is a safe statement that eighty per cent. of the mileage constructed in Canada would not furnish at the date of completion traffic sufficient for two freight trains each way per day. Under such conditions, the receipts are low and the operating expenses high, and it is of the utmost importance that the construction cost be kept low. On the other hand, the country is growing fast, and traffic is increasing rapidly. It is thus necessary that the engineer keep always in view the almost certain necessity of a good road in the future. He should, therefore, so locate and construct his line that the first cost be low, and that the standard may be raised, when necessary without unduly increasing the total expenditure. In order to get the very best results, the line giving best grades, alignment, etc., should always be first located. From this, as a standard, the engineer should work to the final or economic location. Working from a poorer to a better is apt to lead to grave errors.

Where low construction costs are [illegible] and it is probable that a high standard will be required in the future, it is much more effective and advisable to use short sections of temporary line with steep grades, sharp curves, etc., on the heavy or difficult sections, maintaining the higher standard for the light or easy portions of line, than it is to adopt a generally lower standard for the whole route. The first cost of the former will probably be less and may be operated with helper engines as the traffic increases, and may be improved when advisable, while the cost of improving a generally poor road is frequently prohibitive.

The use of sharp curves with short tangents is often a very effective means of reducing cost without materially increasing the operating expenses.

The effect of moderately sharp curvature is essentially different from steep grades, inasmuch as it is not limiting in its effect. The use of one sharp curve does not justify the use of another just as sharp—whereas the use of one ruling grade on a division does justify another as steep.

The use of curves up to 14 degrees does not increase the maintenance or operating expenses. A mile of road in which there are 100 degrees of 10 degree curve, the balance being tangent, does not cost any more to maintain and operate than the same length of road with 100 degrees of 2 degree curve—in fact, if there is any difference, it is in favor of the sharper curvature.

Unless the curvature is so sharp as to be limiting in its effect, there is no serious objection even on the best class of road to a few sharp curves where the amount saved by their use is sufficient to justify their introduction. The conditions which cause curves to be limiting are when they are so sharp as to prevent the use of the higher grades of modern equipment, and when they limit the haulage capacity of the locomotives, or their speed.

Modern equipment is so constructed as to traverse safely 14 degree curves, and much sharper with guard and hold up rails. The standard compensation for curvature on grades is 0.04 foot per degree. A 10 degree curve is thus equivalent, as far as resistance is concerned, to a 0.4 per cent. grade; and a 15 degree curve to a 0.6 per cent. grade. On a 0.4 per cent. it is only necessary that the grade on a 10 degree curve be made level in order that the resistance be not increased. The same thing applies to a 15 degree curve on a 0.6 per cent. grade. It is, therefore, evident that on a road whose ruling grades are 0.4 per cent. 10 degree curves are not limiting to the haulage capacity of the locomotives, nor are 15 degree curves on a 0.6 per cent. grade.

The easy riding speed is dependent on the amount of the allowable elevation of the outer rail. If the maximum be set at six inches, this speed per hour would be.—

on a 3 degree curve 60 miles per hour
" 4 " 50
" 6 " 40
" 8 " [illegible]
" 10 " 30

The safe or allowable speeds would be 10 miles per hour greater.

With the track properly elevated, equipped with tie plates kept in good line and surface, and curves provided with proper easements, 10 degree curves are no more disagreeable to ride over at speed of 30 miles per hour than are 3 degree curves at 60 miles per hour.

The reduction in speed for one mile from 50 to 30 miles per hour only means the loss of 0.8 minutes. To take an extreme case—the Twentieth Century Limited runs from New York to Chicago, 980 miles, in 20 hours, or an average of 49 miles per hour. The introduction of one hundred 10 degree curves each one of which required a slacking of speed to 30 miles per hour for a distance of one mile would increase the running time of such a train by one hour and twenty minutes. Such an increase on a road 1,000 miles long would in nine cases out of ten have an ill effect. A 10 degree curve so long as to require the reduction of speed to [illegible] 30 miles per hour would [illegible] very bad engineering.

It is evident the use of curves as sharp as 10 degrees does not prohibit the employment of modern equipment or limit the hauling capacity of the locomotives [illegible] effect on the speed of freight trains, or on passenger trains where the average speed including stops is not greater than 30 miles per hour. A few such curves only slightly affect the running time where speeds are high.

It is thus clear that a few curves not sharper than 10 degrees are not objectionable on the very best roads where their use results in large savings. As they are not limiting, the use of one such curve is no justification for a second. The introduction of many of them preventing the employment of high speeds for long distances would certainly be objectionable, but an occasional one where large savings result is justifiable on even the highest class of road.

Wooden trestles to replace heavy rock borrow embankments should be used. Such trestles may be designed to safely carry the heaviest class of equipment. When protected by the installation of the best available water supply they are quite safe, and are good for ten years. Such temporary construction also gives time to ascertain the correct requirements for water ways in new countries where there is frequently a dearth of information as to rainfall, flow of streams, etc., and where unless unduly large water ways are left there is danger of washouts. This danger may be even greater than the danger from fire to wooden trestles. Their use instead of heavy rock borrow embankments is of great importance from an economic point of view. One dollar at 5 per cent. compound interest amounts in ten years to $1.63. If rock borrow costs on the original construction, say, $1.75 per cubic yard, it will in ten years time have amounted with interest to $2.85. While, under anything like ordinary conditions train hauled earth embankments on an operated road, made when the trestles require replacement, no not cost over 30 cents per cubic yard, or less than one-ninth of the total cost of a permanent rock embankment made during construction.

Monentum Grades Economical

Momentum grades are a great source of saving in cost without increasing the operating expenses. The use of momentum in overcoming short stretches steeper than the ordinary ruling grade is almost always justifiable. The exception is where the traffic is so congested that the possibility of a delay due to the failure of an occasional train to surmount the grade is more important than the undoubted saving in interest charges which they insure. It will probably be many years before conditions prohibiting their use prevail on any portion of our Canadian railways.

The foregoing are a few of the more important considerations which the locating engineer should keep in view. He should always remember that railways are commercial enterprises, are built for profit, and that the investors are looking for and are entitled to satisfactory interest on their money; and so far as the returns on their investment depend on location they will for a given traffic be the greatest when the sum of the operating expenses and fixed charges is the least amount.

Enjoyable Entertainment Features

On Tuesday, at mid-day, a complimentary luncheon was given to the visiting members by the Montreal branch. The luncheon was held at the St. Regis Hotel and proved a most successful function. On Tuesday evening an informal dinner was given by the Montreal representatives of the Faculty of Applied Science, of the University of Toronto, to visiting graduates and under-graduates. On Tuesday evening, also, a smoking concert was held in the new quarters of the Society at 173 Mansfield street.

Wednesday, January the Twenty-Eighth

Wednesday morning was set apart for a visit to the Montreal Steel Works, an event in which a large number of the members participated. By courtesy of the Tramways Company special cars were provided to convey the party to and from the works at Longue Pointe.

The presentation and adoption of reports submitted by various commitees was the first business transacted at the afternoon session. There was little discussion in connection with any of the reports, with the exception of that submitted by the Committee on Specifications for Steel Bridges. In moving the adoption of the report and the continuation of the committee, Mr. George Mountain, Chief Engineer of the Board of Railway Commissioners, and a past president of the Society, said that the committee was so representative that if it succeeded in arriving at a standard specification he was prepared to recommend that specification for adoption by his Board. In this, Mr. Mountain was opposed very strongly by Mr. C. H. Sutherland, of Montreal, who contended that the engineer should be perfectly at liberty to meet various conditions with various specifications, adding that the principle of endeavoring to put forward a specification and enforce its adoption by all railroads was absolutely wrong.

President Tye remarked that the desire was for uniformity and that the proposed specification was only to be drawn up for guidance and sent out by the Society as a suggestion. Certainly it would be better for the Railway Commission to adopt a standard specification drawn up by the Society than to undertake the work themselves.

By one member it was urged that bridges should not be standardized. It was very well to standardize materials, but such a course in the case of steel bridges tended to place a limitation upon the scope of the engineer and as such should not commend itself to the members. At the close of the discussion the report was adopted and the committee empowered to continue its work under the direction of the Council.

Next followed the reception and adoption of the Report of the Committee of Conservation, which was presented by the Chairman, Mr. James White, of Ottawa. The reports of these two committees (Steel Bridges, and Conservation) are published in this issue.

The closing event at the Wednesday afternoon session was an interesting discussion on the subject of employing alien engineers. This matter had been postponed from the previous day, and Mr. L. G. Robinson, of Vancouver, was now asked to present the views of the British Columbia members. Mr. Robinson's address, in fact, took the form of an appeal for the inauguration of a provincial association of the Society, for British Columbia. Mr. Robinson urged that time and distance made it impossible to refer matters to headquarters. Things moved quickly in the west and by the time communications had been exchanged between the provincial branches and the headquarters at Montreal, events had become stale and the situation had changed considerably. In support of his contention that the British Columbia government had made unwarrantable selections from the ranks of the United States engineers, Mr. Robinson quoted the road and park work at Vancouver Island, for which a United States engineer had been engaged for five years at a salary of $15,000 a year. This engineer, in turn, had appointed a number of United States assistants. The Society was asked to give the engineers of British Columbia the right to assemble and draw up by-laws—not with the idea of seceding from the parent society, but with the view of establishing a strong provincial society, empowered to act. The membership of the branches was not sufficiently influential—as an instance of which Mr. Robinson asserted that while the total membership of the Society was some three thousand, only nine hundred members were enrolled in the various Branches.

Professor L. A. Herdt, of Montreal, suggested asking the British Columbia government to legislate in favor of making all engineers members of the society, to which Mr. Robinson objected that the history of the efforts to establish close corporations was one of failure. Mr. Archibald Currie, of Westminster, observed that the conditions complained of in British Columbia were not peculiar to that province. The same thing was heard of everywhere, and the Council should take no action without giving the matter the most careful consideration.

Mr. James White, of Ottawa, expressed himself as being strongly opposed to breaking up the Society and said that the application under consideration was the thin edge of the wedge in establishing a British Columbia Society of Civil Engineers. The Canadian government was generally disposed to engage Canadian engineers, but sometimes it was inadvisable, as in the case of forestry. Mr. White concluded with the statement that it had been a mistake of Confederation in giving too much power to the provinces and that the same argument was applicable to this problem.

Mr. Robinson offered some further remarks on the subject of experts—apropos of the alleged need for going to the United States for expert advice. Canadian engineering work should be kept under the control of Canadians. Where outside consultations were necessary, care should be taken to obtain the greatest possible experience out of the work. After all, the greater number of engineering enterprises were more or less peculiar to Canadian conditions and expert advice need only be sought in part. It should not be necessary to refer the whole undertaking. "Our business is to build up experts," said Mr. Robinson, in conclusion. In answer to a question as to the need for a separate charter, Mr. Robinson said that the British Columbia government was empowered to give authority only to those resident within the province. Mr. C. E. Cartwright, of Vancouver, quoted the regulations of the United States in regard to fine of $1,000 in engaging a Canadian engineer from this side of the border. The first question invariably asked in other countries was whether the applicant was a citizen of the country in question.

Wednesday, January the Twenty-Ninth

The discussion on the subject of the employment of alien engineers by the Government and the formation of a British Columbia branch was resumed on Thursday morning, Mr. Robinson moving that the matter be referred to the council with power to act.

Arising out of the discussion, the question was raised as to the Quebec Act of the society, and the enforcement of penalties against engineers practising in violation of the Act.

The President said that any member of the society or the Council could take means to enforce the Act, this being in reply to a statement that it was being broken every day.

It was asked if aliens who were members of the Society would be prohibited from doing work for the Government.

Mr. Robinson replied that it was not proposed to interfere with such members.

The President remarked that the Council would have to go into the whole matter, and also as to whether other provinces would desire to form branches in the same way as it was suggested that British Columbia should form a branch.

Mr. Robinson's resolution was agreed to.

The question of party politics and the appointment of engineers was brought up by Mr. Robinson, who commented upon the manner in which politicians used the spoils of office. He believed that citizens would approve the appointment of engineers without regard to politics, and that the appointments should be free from partisan influence.

Mr. G. A. Mountan insisted that the best way to overcome this was to strengthen the society. Political appointments were still made, but not to the same extent as formerly. He referred to the appointment of a British expert to report on the Ottawa water question, and pointed out that the British Society of Civil Engineers had been asked to recommend a gentleman. Their own society would no doubt be similarly consulted, but not while there were three times as many engineers outside the society as there were within its borders.

The President remarked that the society was growing, and would in the future have a greater influence. There had been a gratifying change in the aspect with which technical education was regarded. When he started it was suicidal for a man to state his educational qualifications, the idea being that only practical men were of value. Now the railway companies were encouraging technical education.

Mr. Robinson moved a resolution putting on record the desirability of the separation of appointments from politics, it being left to the Secretary to put this in a suitable form.

On the motion of Mr. V. J. Elmont, seconded by Mr. Robinson, the Council were requested to consider the advisability of preparing specifications for reinforced concrete. Mr. Elmont stated that in Europe and the United States such specifications were in force, and as reinforced concrete was coming more and more into use, the society should follow the lead of others in this matter.

A very long discussion on the proceedings of the Transportation Routes Committee followed. From various causes, little progress has been made, Mr. J. W. Kennedy (the chairman of the committee), the President, and Mr. J. A. Jamieson pointing out that the subject was too large to be dealt with by a committee. The President was of poinion that the Federal Government should take this question up and appoint a permanent commission to deal with it. Various matters, such as the Georgian Bay canal, could be investigated and proper data obtained so that economical routes could be recommended. Mr. Jamieson has prepared much information, and this, it was suggested, should be embodied in the form of a paper.

It was decided to discontinue the committee.

Mr. Jamieson reported that the committee on concrete had secured a great deal of information as to the that of sea water on concrete, and this will probably be embodied in a paper and a report submitted later.

The final discussion of the morning was on the reading of papers and means of making these and the discussions more attractive. The question was raised as to whether the Council were not over-loaded with work, partly due to administering the Montreal affairs of the society, and it was said that if relieved of this, more progress would be made.

Mr. J. W. Harkom moved that the Council should consider the advisability of forming a Montreal branch, to be operated on the same lines as other branches.

Mr. A. Crompton seconded, and in the course of a vigorous speech declared that many of the younger members felt that they were not getting the value they should. They felt diffident as to reading papers, and over-weighted by the older members. The formation of a local branch would be the means of infusing more vitality into the Montreal section.

Mr. H. H. Vaughan replied that the difficulty was to get members to read papers, and he did not see what was to be gained by the formation of a branch as suggested.

Mr. J. W. Kennedy was also opposed to the formation of a branch. The Council would welcome papers by young members, and there need be no fear of harsh criticisms.

Mr. Tye pointed out that for all purposes Montreal now had a separate branch—and it was much more effective than anything that had been suggested. Meetings independent of the Council were held, and the affairs conducted just the same as in a separate branch.

The President (Mr. Phelps Johnson) said that the Council would carefully consider the entire subject, and if possible devise means for making the monthly meetings more attractive to the younger members.

On this understanding the motion was withdrawn.

Mr. Armstrong asked that the Council should prepare a schedule of charges to be made by engineers, but after Prof. McLeod had stated that the Council had considered the matter and that the proposer had found difficulty in framing a satisfactory schedule, the suggestion was negatived.

The preparation of a specification on steel water pipes was referred to the Council.

The following officers for 1913 were elected: President, Mr. Phelps Johnson; Vice-president, Mr. F. C. Gamble, who was successful in the ballot over Mr. H. G. Kelley; Council: District 1, Messrs. J. M. R. Fairbairn, W. J. Francis, and R. J. Durley; No. 2, Mr. F. A. Bowman; No. 3, Mr. W. D. Baillairge; No. 4, Mr. S. J. Chapleau; No. 5, Mr. H. E. T. Haultain; No. 6, Mr. W. A. Duff; No. 7, Mr. T. H. White.

The nominating committee was constituted as follows: District No. 1, Mr. H. M. Jaquays; No. 2, Mr. F. W. W. Doane; No. 3, Mr. F. X. A. Leofred; No. 4, Mr. J. White; No. 5, Mr. G. Sing; No. 6, Mr. W. L. MacKenzie; No. 7, Mr. L. G. Robinson.

Votes of thanks concluded the proceedings.

The Annual Dinner

Mr. W. F. Tye presided at the annual dinner held on the evening of Wednesday, January 29th, at the Ritz Carlton Hotel.

Responding to the toast of "Our Country," proposed by Mr. G. A. Mountain, Col. the Hon. Sam Hughes stated that there was no body of men to whom Canada owed more than to the Civil Engineers. He had in years past wandered over the plains of the West, but at every Indian camp to which he came he heard that the engineer had been there before him. There were many young engineers he knew then who were distinguished men now. Those who were young now should remember that perseverance in their profession, and a knowledge of how to do contracting (laughter) would enable them to prosper also. It was entirely due to the long roads of iron rails engineers had laid that this country had been opened up. Those who had had to travel the western plains in the saddle could best appreciate the benefit of the rails. But it was still only the fringe of the work that had been touched. The Rocky Mountains alone presented an almost limitless field for survey, and for the work of the mining, the electrical, and the civil engineer. The mineral wealth and the water power of that region cried aloud for the engineer to exploit them. The Hudson's Bay region would afford them a field for enterprise for 30 years to come. It was the proud boast of Canada, and of the United States also, that their engineers were a body of men among whom there had scarcely been found an individual who had been false to the trust reposed in him. There was no profession in the country that had a better outlook though he recalled one who had warned his son against becoming an engineer because it was a profession that always encountered either a feast or a famine. There seemed every prospect of a feast, however, for many years to come. It was proposed to institute a corps of military engineers and he thought it would be well if a representative body of engineers was formed on which those present and all other engineers in Canada could be represented.

Mr. W. G. Ross, president of the Harbor Commission, in responding to the toast of "Our Guests," proposed by Mr. G. Janin, remarked that it was evident that the port of Montreal had been developed at a small cost, some 20 millions, when compared with other ports. Fifty millions had been spent on Glasgow harbour, 80 millions on Newcastle, and 75 millions on Manchester. Citing that the amount of money spent on Montreal has been well and economically expended, the speaker pointed out that with the lowest of port charges the interest on her debt is earned and paid, and that a greater monthly business is being done than by Newcastle, Manchester or Glasgow. He took occasion to pay tribute to the harbor commissioners who have recently retired, and his address was virtually a sketch of the history of the development and improvement of the harbor of Montreal, upon which, together with the river, the Government has during the past ten years spent 38 million dollars.

"Up to the year 1908," said the speaker, "the area of the port of Montreal was almost identical with that of Liverpool, extending along the river about seven miles on one side. In that year the commissioners' jurisdiction was extended to sixteen miles on each side of the river, so that to-day the port of Montreal controls 32 miles of waterfront, without a vested interest to impede the progress of her development. "There is not a port in North America," he continued, "and few in the world, that have not had to buy these privileges at a cost of millions, and it should be a source of pride to the citizens of this country that our port is held up as an illustration of how the problem of public ownership may be and has been properly handled and solved, and our policy and methods in this regard are being investigated and studied by all the large progressive ports on the American continent."

In conclusion the speaker said: "Canada is greater in need of members of your profession to-day than at any other time, and in this connection mention must not be omitted of the great works carried on by such familiar names as the Keefers, Shanley, Fleming, Schreiber and last, but not least, of the great work done by Mr. John Kennedy, for so many years chief engineer of our port and at present its consulting engineer."

The toast of "Kindred Societies" ws proposed by Mr. R. F. Uniacke, and responded to by Messrs. A. E. Barlow and Ralph Modjeski; that of "The Society" was proposed by Mr. R. McColl and replied to by Mr. J. G. LeGrand, while that of "The Retiring President and Council" was proposed by Mr. L. G. Robinson and responded to by Mr. W. F. Tye.

Report of the Committee on Conservation

The field of conservation, so far as it affects the engineering profession, is so vast that it was deemed inexpedient to deal with more than one phase of it. At the last annual meeting a communication from Mr. Sauder was addressed to the Society, and, later, referred to the Committee on Conservation. Mr. Sauder wrote:

> "Whereas the water supplies, water powers, navigation of our rivers, irrigation of our semi-arid lands, drainage of our over-flow and swamp lands and the sanitary conditions of our streams and their water sheds generally are a great asset.
>
> "Whereas an accurate knowledge of a flow of water in nearly all important streams is essential for the solution of many problems in connection with navigation, water power, irrigation, domestic and industrial water supplies, mining, bridge building, river channel protection, flood prevention and storage for conservation of flood waters.
>
> "Whereas it is the opinion of the Society that the matter of the topographical and hydrographic surveys to determine the location and quantity of water supply and the proper methods of conserving it should be undertaken by the Federal Government.
>
> "Therefore be it resolved: That this Society, while recognizing the work already done, urges strongly upon the Dominion Government the importance of making the necessary appropriations and providing the necessary staff to undertake in an intelligent and systematic manner, the gauging of all streams of water supply and the location and survey of all sites suitable for reservoirs for the storage of water."

This letter was referred to the members of the Committee and the concluding statements of the report embody the substance of the replies received from them. In view, however, of the importance of the subject it was deemed advisable to take this subject—Water Supply and its Conservation in Canada—as the special subject for this year's report.

When planning to develop [illegible] tion channel, the first consideration is: What is the minimum flow? The speed of a squadron is the speed of the slowest vessel, and, speaking generally, the minimum flow is a determining factor in a water-power or a navigation project. The minimum flow may often be increased by storage in reservoirs but the initial step is to determine its amount and the maximum period that it may be expected to continue.

In arriving at anything approaching a reliable estimate of the minimum flow of a stream, a series of continuous gaugings extending over a considerable period is absolutely necessary. George W. Rafter, in Water Supply Paper No. 80, published by the United States Geological Survey, says:

> "Further, it can be stated that, for records from twenty years to thirty-five years in length, the error may be expected to vary from 3.25 per cent down to 2 per cent, and that, for the shorter periods of five, ten and fifteen years, the probable extreme deviation from the mean would be 15 per cent., 8.25 per cent., and 4.75 per cent. respectively."

Rafter says, further, that with less complete records,

> "Mr. Henry reached the conclusion that at least 35 to 40 years' observations are required to obtain a result that will not depart more than five per cent. from the true normal. The average variation of a 35-year period was found to be five per cent. and for a 40-year period three per cent."

From the foregoing, it is evident that unless the engineer is in a position to allow a margin on the safe side, he should have continuous gaugings extending over at least ten years. As an example of an erroneous estimate based on insufficient data, the Rainy River at Fort Frances may be cited. Three engineers, reporting separately, estimated the power at 30,800, 33,000 and 34,741 horse power respectively. In the summer of 1911, they were able to generate less than 11,000, and, to do this, it was necessary to keep the stop-logs in all day Sunday, thus stopping navigation. Had gaugings extending over, say, ten years, been available, no such over-estimates would have been made, and, had they included the very dry season of 1895, they would, probably, have shown as small a flow as in 1911.

Canada is particularly favored as regards reservoir possibilities. The whole of the northern portion of the Dominion is occupied by a series of granitic rocks, which have a U-shaped form and surround Hudson Bay. This has been called the Archaean nucleus and, considered in the large, it forms a great plateau. To quote the words of the late Dr. G. M. Dawson,

> "It constitutes, moreover, a gathering ground for many large and almost innumerable small rivers and streams, which, in the sources of power they offer in their descent to the lower levels, are likely to prove, in the near future, of greater and more permanent value to the industries of the country than a great coal-field."

The foregoing was written sixteen years ago, and, with the tremendous strides in electrical engineering, is even truer to-day than then.

The most remarkable features of this Laurentian area are the innumerable lakes which serve as natural reservoirs to regulate the run-off and which can, in many cases, have their storage capacity increased by damming.

In considering the work of stream-gauging in Canada, the provinces have been dealt with in geographical order from east to west.

In the Maritime Provinces, the streams are small and very little gauging has been done except on the St. John River and some of its tributaries. The work on the St. John [illegible] as a result of differences between Canada and the United States respecting the provisions of the Ashburton Treaty affecting this stream. The St. John above the Allagash and at Fort Kent, the Allagash, St. Francis, and Madawaska and Aroostook have been gauged. Measurements have also been taken on the St. Croix River which forms the southern boundary between New Brunswick and Maine. So far as ascertainable, nothing has been done in the way of investigating sites for reservoirs except the reconnaissance surveys made by the Commission of Conservation in 1912.

In Quebec, the more important power companies keep records of the streams on which they are operating. Between Lake St. Francis and Sorel, the Department of Public Works has at present nine gauges. Two of these gauges are of the self-recording type and four others of the same type will be in operation next summer.

The Department of Public Works has sixteen gauges on the Ottawa River, and also maintains gauges on its important tributaries. The engineers of the Georgian Bay Ship Canal, appreciating the importance of stream measurements, made in their report the following recommendation:

> "That it is of great importance to continue every year the flow measurement of the Ottawa, Mattawa and French Rivers, at low, ordinary and high water stage, in order to have continuous records of same, which will prove invaluable in the further development of the canal problem, in case of construction, and a better knowledge of the water-power possibilities."

On the Richelieu River, the depths on the lock sills of the Chambly canal, at St. Johns, have been recorded daily since 1869 and the level of Lake Champlain has been noted daily at Fort Montgomery, N.Y., since 1871. At Montreal, the depths of water on the lower lock sill of the Lachine Canal have been measured at noon each day since 1851.

The Province of Quebec has appointed a Commission with the Hon. S. N. Parent, as Chairman. They have recommended the construction of a large dam on the upper waters of the St. Maurice to regulate the flow and have three parties in the field making topographical and hydrographic surveys of various rivers in the province.

On the St. Lawrence above Montreal the depths on the lock sills have been recorded since 1860. These, therefore, give an excellent series of gauge readings for the river at Lake St. Louis, Lake St. Francis, Long Sault Rapids, Farrans Point, Morrisburg and Cardinal. Similarly, the canal records at Ste. Anne, Carillon and Grenville determine the regimen of the Ottawa since 1870, while the lock depths at Ottawa extend back to 1844. For lakes Superior, Huron and Erie, the records cover the period since 1860, while the Toronto gauge records of Lake Ontario extend back to 1854.

In the western portion of Ontario the Departments of the Interior and Public Works have established one gauge on Rainy Lake and five on Rainy River. Next summer five of them will be replaced by self-reading gauges. In connection with the investigation of the water-levels of the Lake of the Woods, the International Joint Commission will establish others on the upper waters of the Rainy River.

So far as work by provincial governments is concerned, Ontario is much the most advanced. Its Hydro-electric Power Commission has established gauging stations on a great many of the streams of the province and is carrying on the work of stream-gauging in a thorough and systematic manner; possibly the only improvement in this connection would be the establishment of additional stations until all the streams of importance are included in the work.

The powers conferred upon the Commission in this connection may be described as follows:

"It is duly authorized to investigate and report to the Lieutenant-Governor-in-Council upon any and all hydraulic, hydro-electric and other power undertakings, whether developed or undeveloped, throughout the province."

In connection with the water powers of the Winnipeg River, the Water Powers Branch of the Department of the Interior has investigated the water resources of the Lake of the Woods drainage basin. In conjunction with the Department of Public Works, gauging stations have been established on Rainy River and certain important streams falling into Rainy Lake and a study has been made of the outflow from the Lake of the Woods.

While in the Maritime Provinces, Quebec, Ontario and British Columbia, except the Railway Belt and Peace River Block, the water powers are disposed of and are under provincial jurisdiction, in the Prairie Provinces, Manitoba, Saskatchewan and Alberta, they are under the control of the Dominion Government. This right was reserved when the provinces were created with a view of better conserving their waters as a whole and for this purpose a large forest area on the eastern slope of the Rocky Mountains has, recently, been segregated by the Dominion.

In Manitoba, the Water Powers Branch of the Department of the Interior has established stations on the more important rivers where information is required in connection with waterpowers, drainage, navigation, etc. The work is being extended over the whole province to meet the economic conditions.

The Dominion Government has, for some time past, made investigations of the flow of streams in the latter provinces and, although these investigations were more particularly for irrigation purposes, they also have an indirect bearing on waterpowers. The following is an extract from one of the reports on this work:

"The records of stream flow published by the Irrigation Surveys give a fair approximation of the discharge of the principal streams in Southern Alberta and Saskatchewan at the different stages, but do not give the duration of the periods of high and flood discharge. As the water supply in some of the larger streams is apparently almost all recorded, the necessity of carrying on a systematic observance of daily discharge is evident.

Features of Hydrographic Work

"The chief features of the hydrographic work are the collection of data relating to the flow of the surface waters and the conditions affecting this flow. Information is also collected concerning the river profiles, duration and magnitude of floods, waterpower, etc., which may be of use in hydrographic studies.

"In organizing the Hydrographic Surveys it was realized that with the funds available, it would be impossible to make complete investigations of the whole of the water supply in the irrigation tract, but an effort was made to include all the more important streams. Gauging stations had already been established, by the Irrigation Surveys, on a number of the more important streams, and it was important that the observatoions at least should be continued without interruption. There were, however, many streams of considerable importance upon which there were no gauging stations. It therefore became the policy of the survey to continue the investigations at the stations already established and to establish other stations as soon as possible."

Unfortunately, as the work is being pursued in connection with irrigation, it does not include any figures for the winter season, which additional data would be of great value from a waterpower standpoint; this is recognized in the following quotation also from the report above cited:

"On streams where power is likely to be developed, special attention should be given to the low water flow, which in most cases occurs during the winter. For this reason it is very important that stream measurements should be continued during the winter on a number of the more important streams."

In British Columbia, the Water Powers Branch has a permanent organization known as the Railway Belt Survey. Gauging stations have been established on the important water-power rivers in the Railway Belt and special attention has been given to the streams in the so-called "Dry Belt."

During 1911 and 1912, the Commission of Conservation made reconnaissance surveys of water-powers in southern and central British Columbia and this work will be continued. In 1912, the Department of Lands of British Columbia, recognizing the value of this work, appropriated nearly $2,500 in addition to the amount expended by the Commission of Conservation and will, this year, make a grant of $5,000. This work, however, is only in the nature of a reconnaissance and, wherever the development of the country indicates that the water will be economically usable, it should be followed up by such measurements as the Water Powers Branch of the Department of the Interior is now carrying on.

Importance of Systematic Stream Gauging

The great importance of systematic stream gauging in Canada cannot be over estimated. On the information furnished by the government will depend to a great extent the development of water-power. Very often, before designing a development, the hydraulic engineer has to spend a year or more in making observations which in many cases are practically useless, because they do not cover a sufficiently long period, and the result is that the possible development is either much over-estimated or, in other cases, much under-estimated.

Although most of the waters of Canada are under provincial control, this matter of stream gauging is not only important to the different provinces, but it is of national importance, and the Federal authorities should undertake the gauging of Interprovincial and International rivers to collect this all-important data in a systematic and uniform manner.

The Provincial Government could make a beginning by devoting their attention altogether to the establishment of stations where the water levels only would be read, leaving, if necessary, for future years the systematic observations required to convert these water heights to discharges. It was in this manner that it has been possible to calculate the different discharges of the Ottawa River since 1844; water-levels only had been kept since that date by the lockmasters of the canal at Ottawa and it was only comparatively recently that observations were taken to convert these water-levels into actual discharges.

For the present, of course, it would be out of the question to have these stations on all of our streams, but a start might be made on the more accessible ones or those on which storage and conservation will become a necessity or a natural outcome at some future date. At present, there are very few streams in Canada on which artificial storage or conservation is being practised, because it has not yet become commercially economical or necessary to do so. When the power possibilities of a stream under natural flow have been exhausted at one site, other sites, nearby, on the same or other streams have been found and developed, this requiring less outlay per h.p. than would have been required to conserve the flow of the stream. This [illegible] cannot go on forever, and a time will come when the last site within an economical radius will have been secured and the conservation of the stream will have to be resorted to in order to satisfy the increasing demand for power. When this time comes, in order to develop a conservation scheme on any stream intelligently, it will be necessary to possess a complete history of the flow of the stream under consideration for a period of at least from ten to fifteen years previous, and, unless a beginning is made now on the history of flow of some of these streams, when the time comes to conserve them, the data at hand will be found very meagre and the conservation scheme will have to be designed on a more or less haphazard basis.

With federal co-operation, the system now described in Ontario could probably be continued and extended to comprise other streams and establish new stations more rapidly.

In Quebec and the Maritime Provinces, much data on this subject could no doubt, first of all, be collected from private parties or large hydraulic plants where records of river heights have been kept, and a system similar to that of Ontario or a modification to suit local conditions could be started at once and the returns from the different stations throughout Canada sent to their provincial authorities as well as to Ottawa, where they could be tabulated in a uniform manner and printed for easy access to the public.

Other countries with less water-power possibilities than Canada have devoted a great deal of attention to systematic observation of stream flow, namely: Italy, Switzerland, Bavaria, France and other European countries. In the United States, the Geological Survey has, for years, devoted a great deal of attention to the subject of stream measurement and has developed an excellent system, both of carrying out the work in the field and of reporting and tabulating the data obtained.

Difficulty of Observations in Winter

In Canada, one of the greatest difficulties to be overcome in connection with this work is the taking of observations during the winter season, as practically all our streams are then frozen over. These difficulties, however, can be overcome and they are always more than balanced by the importance of obtaining complete and reliable data during the very time when the rivers are in this condition.

In a report on "Stream Flow During the Frozen Season," Messrs. H. K. Barrows and R. E. Horton of the U. S. Geological Survey, say in part—"There is not even an approximate relation between the snow-fall and the stream flow, so that the failure to obtain winter records of flow at a gauging station means a considerable percentage of uncertainty as to the total run-off as well as its distribution. In northern states droughts are apt to occur in the late summer or fall and during the winter. At times this condition of drought may be nearly or quite continuous between these two periods, with its culmination in January or February. If there is no melting of snow during the winter, the inflow to streams that freeze is chiefly derived from springs, ground water, and lake storage and in a long, cold winter, especially if it succeeds a period of low water, the minimum flow for the year may be reached and continue for some time. Estimates of flow, therefore, to be of conclusive value on streams utilized for water-power, must embrace these winter periods of low water."

It is needless to add that the winter conditions which occur in Northern United States rivers are found even in a more marked degree in Canadian rivers, and it follows that the statement just quoted applies with a proportionately greater force to Canada.

Summing up, the Committee on Conservation is of the opinion that, while the work recommended by Mr. Sauder, viz., topographical and hydrographical surveys to determine the situation and quantity of water supply, should be undertaken by the Dominion Government, and is of great importance, it is probable that the government is, at the present time, carrying on more extensive and detailed investigations of this nature than is generally appreciated. That, while a certain amount of concentration to avoid duplication and overlapping of work is necessary, the scale upon which the work has been initiated indicates that the needs of the country in this respect will be met.

That the work already done is of great value but that much of it is not, in its present form, available to the engineers, and,

That steps should be taken to secure such publication and distribution of this information as will bring it within the reach of every engineer in Canada.

REPORT OF COMMITTEE ON SPECIFICATION FOR STEEL BRIDGES

Your Committee on Specification for Steel Railway Bridges begs to submit its final report on the first section of the work entrusted to them, namely, Specification for Steel Railway Bridges—Fixed Spans.

Your Committee presented its first preliminary report to the Society at their general meeting last year, when it was decided to send copies of this report to all the members, and asked that meetings be called at the various branches at which this report should be discussed, copies of such discussion being forwarded to the Secretary. Discussions on this report were received from the following members of the Society; C. R. Young, J. W. Harkom, J. G. Legrand, W. A. Duff, .P L. Pratley, O. K. Peck, A. Smith, F. P. Shearwood, E. H. Darling, W. Chase Thompson, C. N. Monsarrat, G. H. Duggan, E. Brydone-Jack, H. Steenbuch and Jos. Mayer.

This entire discussion was tabulated and forwarded to each of the members of the Committee, for comment thereon.

It might be pointed out that practically the only point upon which any general discussion arose were those of "impact" and "column formulae." With regard to the former, some members of the Society were inclined to adopt the tentative formula suggested by Prof. Turneaure. As the opinion of the different members on this point varied to a very large extent, and as the formula of Porf. Turneaure was not put forward by him for adoption but simply as an interim report of investigations, your Committee felt that they would not be justified in making such a radical change, and have therefore adopted a formula that has been generally accepted as good practice.

In regard to the column formulae, many suggestions were received as to the proper formula to be used, but the consensus of opinion appeared to be in favor of the straight line formula, which has been adpoted in so many of the existing specifications, and which, under ordinary conditions, agrees very closely with the results as established by actual tests.

As the members of your Committee are so widely scattered, it has been impossible for them all to get together and deal with the matter under discussion, the result being that the greater part of the work has fallen upon the shoulders of the local members, who have had to decide on the various points to a more or less extent.

It is probable that the specifications as prepared will not meet the views of all members of the Committee or of the Society, in fact in dealing with such a subject it could hardly be expected that a full agreement on so many important questions could be reached. It has been the endeavor of your Committee, however, to consider the different points brought up as broad-mindedly as possible, both from the engineer's standpoint as well as that of the contractor, and to arrive at a result that will combine the best interpretation of bridge engineering practice with the most up-to-date and generally approved shop practice.

It is the opinion of the majority of your Committee that it would be desirable to issue separate specifications for the distinctly different types of bridges. With this idea in view, they have included in the first section only such information as applies to Fixed Span Railway Bridges.

Your Committee is now going ahead with the preparation of specifications on the other sections, namely, Highway Bridges and Movable Bridges (including swing and lift bridges and turntables).

AN EARLY RECORD OF THE ATTENDANCE

J. J. Aldred, Ottawa.
C. Altberg, Montreal.
L. A. Amos, Montreal.
A. A. Anderson, Ottawa.
R. Armour, Montreal.
C. J. Armstrong, Montreal.
J. B. Armstrong, St. John,
M. B. Atkinson, Montreal.
W. D. Baillairge, Quebec.
J. D. Barnet, Stratford, Ont.
H. E. Bates, Nelsonville.
S. H. Baulne, Montreal.
J. E. Beatty, Montreal.
A. F. Beers, Montreal.
F. X. T. Berlinquet, Three Rivers, Que.
A. Bertram, Dundas, Ont.
R. W. Bishop, Owen Sound.
W. D. Black, Montreal.
M. S. Blaiklock, Montreal.
S. Blumenthal, Montreal.
Major J. L. H. Bogart Ottawa.
H. P. Borden, Montreal.
G. M. Boyd, St. Adolphe de Howard.
A. Boyer, Montreal.
H. V. Brayley, Ottawa (Sec. Ottawa Branch).
C. B. Brown, Montreal.
F. B. Brown, Montreal.
T. Breen, Quebec.
W. H. Breithaupt, Berlin.
J. S. Busfield, Montreal.
W. J. Camp, Montreal.
H. M. Campbell, Montreal.
M. M. Cantley, Montreal.
C. E. Cartwright, Vancouver.
C. L. Cate, Montreal.
R. M. Charlton, Eleuthere.
A. Chausse, Montreal.
P. G. Cherry, Toronto.
W. Chipman, Toronto.
W. Clerk, Montreal.
P. E. de la Cour, Montreal.
C. R. Coutlee, Ottawa.
F. W. Cowie, Montreal.
A. Crompton, Port Hope.
A. Currie, Montreal.
H. Daw, Montreal.
G. W. N. Day, Toronto.
H. S. Deubelbeiss, Mont.
V. O. G. Dey, Montreal.
A. S. Dickison, Montreal.
W. N. Dietrich, Montreal.
R. L. Dobbin, Moose Jaw.
M. A. Downes, Montreal.
J. Duchastel, Montreal.
W. R. Duckworth, Montreal.
P. J. Duff, Dryden, Ont.
H. S. Duggan, Montreal.
R. J. Durley, Montreal.
V. J. Elmont, Montreal.
B. O. Erikson, Montreal.
J. Ewing, Montreal.
J. M. R. Fairbairn, Montreal.
H. W. Fairlie, Montreal.
F. E. Field, Montreal.
E. G. Fisch, Montreal.
W. J. Francis, Montreal.
J. Gallagher, Quebec.
A. Ghysens, Montreal.
J. Greene, Montreal.
R. M. Hannaford, Montreal.
A. L. Harkness, Montreal.
J. W. Harkom, Melbourne.
J. B. Harvey, Montreal.
J. W. Heckman, Montreal.
M. C. Hendry, Ottawa.
L. A. Herdt, Montreal.
H. J. Heygate, Hearst, Ont.
T. H. Hogg, Toronto.
H. Halgate, Montreal.
J. N. Hunter, Montreal.
T. C. Irving, Jr., Toronto.
J. A. Jamieson, Montreal.
G. Janin, Montreal.
H. M. Jaquays, Montreal.
F. C. Jewett, Campbellford.
P. Johnson, Montreal.
A. J. Kelly, Montreal.
H. C. Kennedy, Montreal.
J. C. Kennedy, Vancouver.
J. W. Kennedy, Montreal.
W. A. Kennedy, Montreal.
W. A. Kennedy, Vancouver.
H. Labreque, Montreal.
J. A. Lalonde, Montreal.
H. J. Lamb, Windsor, Ont.
H. M. Lamb, Montreal.
G. E. LeMotbe, Montreal.
A. Lariviere, Montreal.
W. D. Lawrence, Montreal.
J. G. LeGrand, Winnipeg.
R. LePage, Montreal.
A. Leoford, Quebec.
Lt.-Col. H. B. Lordly, Mont.
E. S. M. Lovelace, Montreal.
T. R. Loudon, Toronto.
H. D. Lumsden, Toronto.
C. D. Lyon, Hearst, Ont.
A. R. Macgown, Moncton.
H. M. Mackay, Montreal.
W. B. Mackenzie, Moncton.
A. Malchelosse, Montreal.
G. E. L. Mallory, Montreal.
E. E. Malvern, Montreal.
E. Marceau, Montreal.
H. Massue, Montreal.
W. G. Matheson, New Glasgow, N.S.
E. S. Mattice, Montreal.
J. Mayer, Montreal.
W. J. McAllister, Montreal.
R. M. McKillop, Montreal.
W. F. McKnight, Peterboro.
D. W. McLachlan, Ottawa.
K. R. McLennan, Montreal.
C. H. McLeod, Montreal.
N. M. McLeod, Montreal.
F. C. McMath, Walkerville.
J. J. McNab, Trenton, Ont.

W. McNab, Montreal.
A. J. Meyers, Montreal.
J. L. Michaud, Montreal.
A. G. Millican, Montreal.
C. H. Mitchell, Toronto.
R. Modjeski, Chicago, Ill.
C. N. Monserrat, Montreal.
P. B. Motley, Montreal.
G. A. Mountain, Ottawa.
W. Murdoch, St. John, N.B.
W. A. Murray, Montreal.
A. B. Normandin, Quebec.
S .E. Oliver, Quebec.
C. F. Osler, Montreal.
F. D. Painchaud, Quebec.
L. G. Papineau, Montreal.
P. E. Parent, Quebec.
S. D. Parker, Ottawa.
J. N. Patton, Montreal.
C. H. Pinhey, Ottawa.
F. H. Pitcher, Montreal.
J. C. Porte, Montreal.
A. A. Putnam, Vancouver.
D. C. Raymond, Toronto.
L. G. Robinson, Vancouver.
H. W. Read, Montreal.
W. M. Reid, Montreal.
G. E. Roehm, Walkerville.
R. B. Rogers, Peterboro.
H. Ralph, Montreal.
R. T. Sailman, Montreal.
J. J. Salmond, Toronto.
M. A. Sammett, Montreal.
C. C. Schneider, Philadelphia
T. H. Schwitzer, Ottawa.
J. W. Seens, Montreal.
B. W. Seton, Montreal.
P. Seurot, Montreal.
F. P. Shearwood, Montreal.
C. N. Shanly, Montreal.
A. B. Smith, Montreal.
J. Spelman, Montreal.
A. T. Spencer, Montreal.
L. J. Street, Montreal.
H. L. Steinbach, Winnipeg.
A. Surveyer, Montreal.
C. H. Sutherland, Montreal.
A. D. Swan, Montreal.
H. W. Tate, Toronto.
L. R. Thomson, Montreal.
T. K. Thomson, New York City.
W. C. Thomson, Montreal.
W. F. Tye, Toronto.
R. F. Uniacke, Toronto.
J. H. Valiquette, Quebec.
H. H. Vaughan, Montreal.
L. Verge, Quebec.
G. W. Volckman, Ottawa.
H. Wallis, Montreal.
J. P. Watson, Montreal.
C. W. West, Campbellford, N.B.
F. W. C. Wetmore, Woodstock, N.B.
J. White, Ottawa.
T. Wilkie, Toronto.
J. L. Wilson, Montreal.
L. R. Wilson, Montreal.
M. Wolff, St. Casimer, Que.
W. Young, Ottawa.

Annual Meeting of the Vancouver and Victoria Branches of The Canadian Society of Civil Engineers

THE first annual convention of the Vancouver and Victoria Branches of the C. S. C. E. was held recently in Victoria under the chairmanship of Mr. F. C. Gamble, Chief Engineer of Railways for British Columbia and chairman of the Victoria Branch of the Society.

In an interesting address, Mr. Gamble expressed the hope that the meeting would mark the inauguration of an annual gathering and stated that the convention would be held in Vancouver next year. Mr. Gamble continued:

"The primary object of this Convention is to discuss a question of the most vital importance to our profession in Canada, and more particularly in this province. This question is the selection of alien civil engineers for many positions of more or less importance, to which the highest recompense is attached, to the exclusion of Canadian and other British civil engineers. The stand our Society takes in this matter will without doubt be clearly stated and discussed with moderation and calmness, and with a dignity which cannot but command the attenton and respect of those most closely concerned.

"The second object is the consideration of the protection which the profession of civil engineers in Canada is entitled to enjoy in the same measure, or something approaching to it, as that accorded to other learned professions in this province, namely the law, the medical, the dental and the surveying professions.

"The third object of this convention is to hear papers on engineering and kindred subjects read and discussed. This will be of great interest, and will, it is hoped, meet with your approbation.

"The fourth, and final, purpose is to inspire the members of our profession with courage and determination to work together, [illegible] aside petty jealousies for the general benefit, and to acquire, through the exercise of the highest ideals the proper position among the learned professions to which we are justly entitled.

"The time has gone by when the general conception of a civil engineer was a man clad in blue overalls, stuck into top boots, flannel shirt, and slouch hat, squinting through a "tube" as it was called. This is all very well as far as it goes, and the remarks convey no disparagement to the working man, but the civil engineer to-day is something more than this. He does not only deal in material things, but his range of culture must embrace the Arts; he must be prepared to take his place with the best and greatest in the world, in social intercourse, on the platform and in literature. He must interest himself in the humanities, he must not withdraw into his shell of technical knowledge. If he does he becomes narrow-minded and will never take his proper place in the economy of his country.

"I am convinced, and this idea has been conveyed to me by others, that in the future, and perhaps not in the distant future, the leaders of the world will be civil engineers; men not only brilliant and sound in the science of their profession which properly applied is enlarging and not narrowing, but men broad, strong, learned and cultured, sympathetic in all that tends to elevate a man to the highest positions in the gift and confidence of the people. Emerson says:

"The mind that is parallel with the laws of Nature must be strong with their strength."

"The civil engineer, while directing 'the great sources of power in Nature to the use and convenience of man,' must press onward towards the high ideals and the leadership of the world. To quote from a lecture given by Colonel Prout at Ithaca, 'We must get command of the sources of power in Nature and then within ourselves we must have courage and candour, fortitude, imagination and devotion; and the greatest quality of all is devotion.'

"May we have the wit to discern what is true, and the fortitude to practice what is good."

The outstanding feature of interest at the convention was the discussion regarding the employing of alien engineers. The points adduced were covered in a more advanced stage at the convention of the parent society in Montreal last week, reported elsewhere in this issue. The following resolution was adopted unanimously:

"Whereas, the attention of the provincial government has been drawn by the Society of Canadian Civil Engineers, both by a deputation and subsequently by a letter dated October 4, 1912, to the practice of appointing alien civil engineers to remunerative and responsible positions in the public service, and whereas there are at present available in this province, both in government service and private practice, a sufficient number of fully qualified and experienced civil engineers, who are Canadians or British subjects, to fill all the positions in the public service,

"Be it resolved that the members of the Canadian Society of Civil Engineers in British Columbia do most emphatically protest against the continuance of the above condition, which is entirely at variance with the practice of other countries. Nothing in this resolution is intended to preclude the employment of expert civil engineers who are aliens, in consultation when the civil engineer in charge of any important work deems such consultation advisable.

"And be it further resolved that a copy of this resolution be forwarded to the Dominion Government, the Government of British Columbia and the municipalities of the province."

Good results have been obtained from the installation of the water service at Point Grey, B.C. Nineteen miles of mains have already been laid [illegible] [illegible] been placed for similar work this year.

Specifications for Building Work

Should Bear the Impress of the Writer's Individuality, Apart from the General Conditions—The Architect's Viewpoint

By W. C. F. Gillam, M.S.A., Licentiate R.I.B.A., Vancouver, B.C.

THE specification for any building work should be undertaken with every care: first, as a duty to one's client, secondly, as a duty to the contractor who is to execute the provisions therein contained, and thirdly, as a duty to the architect himself. Whilst the drawings give general ideas of what the architect's intentions are, the specification should describe the procedure and methods of construction and the component parts of the materials in minute detail. Particularly so in Canada, the utmost care should be taken, as owing to the system of blue prints in vogue, it is impossible to describe the different materials from colored drawings or tracings, as in practice in the Old Country.

It is essential that the architect shall be thoroughly at home at his business or profession, as no amount of book knowledge can have any comparison with actual experience. In the writer's opinion the proper person to write the specification is the one who prepared the drawings, as that person is more closely in touch with the idea and expression of thought therein contained.

It must be confessed that generally speaking the majority of architects look upon the writing of a specification as a necessary evil, and at the best to be an irksome and tiresome task, but by concentrating the entire thought upon the subject, the writing of the specification will afford great interest, if not pleasure.

It is but little use attempting to write a complete specification by snatches, filling in odd moments here and there, for the undertaking must be entered upon and continued without interruption from start to finish, so that uninterrupted thought and attention may be devoted to it, and it is only by so doing that the specification can be satisfactory and not a source of worry, by remembering items that should have been included, but through the causes previously mentioned, have been overlooked.

It is suggested that it would be an excellent plan if one could make the specifications to have a mark of the architect's individuality upon them, something that will make them different from the usual run of specifications. How often do we hear the contractor say, "Oh, I didn't read it at all; specifications are about the same." Although, whilst endeavoring to make it one's own particular type of specification, special care should be taken not to alter the meaning of several clauses, especially in the General Conditions, there it will be safer to employ the usual legal phraseology.

An excellent procedure, whilst the drawings are in course of preparation, is to jot down any particular point that may arise, so that, during the writing of the specification the special points may not be overlooked. Apart from this, the notes will be found of great assistance in many other ways.

The opening clauses of the specification should, of course, be "General Conditions and "Form of Contract," and it is suggested that all members of the Society would do well to take as an ideal set of conditions those which have been formulated by the sub-committee of the Society, who have undertaken that important task. That model set of conditions and form of contract, it is understood, will shortly be brought before the Society for approval, but in the meantime the Model Set of Conditions and Form of Contract issued by the Royal Institute of British Architects might be used, modifying, of course, any clauses that conflict or are not applicable to the province of British Columbia.

It will be found that it is an excellent practice when the architect wishes to specify any particular goods or materials from any particular merchant—say bricks—for instance, to specify the same in a clause after this method—"The whole of the facing bricks are to be obtained from Messrs So & So, or any bricks equal to the same in every respect," a sample of which may be inspected at the architect's office. By this means any suggestion that the architect is running any particular firm will be avoided.

Precision in Descriptive Matter

Be precise in your descriptions. If there are any points which you are in doubt about, or that you are not fully conversant with, look them up or make enquiries and then specify. Make up your mind you want and insert that particular make of goods or method of construction, and stick to it, no matter what pressure to alter is brought to bear (either by contractor or merchant) provided, always, unless you can be convinced that some other material, brand, or method of construction is more desirable after having it brought before your notice.

A most important item in the preparation of a specification is to express your thoughts and intentions so that there can be but one version in the reading of the clause or clauses, and that **your own.** Much annoyance can be thus avoided.

Whilst describing any fitment or fixture try to look at it from the contractor's point of view. Make the description clear so that there can be no vagueness, and so that the contractor will be able to figure the item somewhere near the correct price.

To instance—often can an item be found in a weak specification like this, "The cupboard in children's room to be to detail." Now this is not carrying out the architect's duty to the contractor. It is impossible for the contractor to do otherwise than make a guess at the value, whereas had the item been specified as follows no such difficulty would be found, "The cupboard in the children's room to be 5 feet long, 7 feet 6 inches high, and 16 inches deep, to have 1¼ beaded fronts, 1 inch glued and tongue top and ends, having pair of 1¼ folding doors, and fitted with tier of four 1 inch shelves. Quarter of the inside space fitted with nest of drawers 4 inches deep with 1 inch dovetailed fronts, all hardwood runners, brass drop handles, etc. Put approved brass cupboard lock and 4-inch neck bolt. Put 6-inch moulding as cornice with mitred and returned ends and ⅝ x 4 inch base or plinth board. The whole to detail to be supplied."

Schedule of Trades

The following list gives the trades in the rotation usually adopted and may be followed with slight alterations: 1, general conditions; 2, showing hoarding and general timber work; 3, excavator; 4, well sinker; 5, drain layer; 6, concretor; 7, bricklayer; 8, mason; 9, terra cotta and fallice worker; 10, structural engineer; 11, reinforced concrete and fireproof construction; 13, carpenter and joiner; 14, ironmonger (hardware); 15, roofer, including metal worker; 16, founder and smith; 17, plumber and gas fitter; 18, heating and ventilating engineer; 19, electrical work; 20, marble mason and mosaic worker; 21, plasterer; 22, glazier; 23, painter and decorator; 24, paper hanger.

Take each trade separately, keep in mind the sequence that should be kept whilst carrying out the provisions of each particular trade, also keep by your side some rough paper for making notes of any points that will occur or recur in another trade, and it will sometimes be found that in describing some particular item it will suggest some other item in a totally different trade. It is well to have in each trade a "blanketting clause" that will cover every point. This is, of course, from the architect's point of view entirely, but the architect should not (in his duty to the contractor) take undue advantage of the same.

It is proposed now to take the trades in their sequence as already noted, and draw attention to some of the most important items.

General Conditions.—These have already been referred to, but it is the architect's duty to his client to see that he is protected from any legal actions which may be taken against him for accidents, through faults or mistakes of the contractor, and the clause should be somewhat after these lines: "The contractor, his heirs and assigns, shall hold the employer harmless from any damage that may occur to any person, animals and things, to the workmen themselves, for any accident occasioned through the carrying out of the contract. The contractor shall also be responsible for all damages to the works themselves and the adjoining property."

Again the following may be used in small contracts which prevent a vexatious contractor from continually complaining, "Oh, it isn't in the specification." "The contractor shall provide everything requisite for completely finishing the works, whether the same may or may not be shown upon the drawings, or described in the specification provided the same may reasonably be inferred therefrom."

Shoring, Hoarding and General Timber Work.—The architect in duty bound to his client and himself must take into consideration the question of shoring, should any be required, and great care should be taken in specifying the methods to be employed, or he may find that he is made a party to any defects to the adjoining owners' property.

Hoarding.—When the building is of a public character, it will be well to specify the kind of hoarding to be employed, and when it is likely to be kept for a considerable period a special design should be thought out and stated. In all public or semi-public contracts no bill posting should be allowed, and in other works the architect's approval should be obtained before allowing any advertisement thereon. Probably it would be desirable to reserve to the building owner the right to let the hoarding for advertising purposes.

General Timber Work.—This should refer primarily to all timbering and excavations.

Well Sinker.—This item will seldom come into city contracts, but in suburban districts it may be necessary. The architect should take care that the responsibility of all accidents, caving in, etc., rests solely upon that particular contractor.

Drain Layer.—This trade requires the utmost care in describing as the works therein contained are so closely related to the health of the community at large.

Concretor.—The architect should clearly state exactly what the proportions and component materials are to be, and see that they are carried out.

Bricklayer.—The usual clause will cover this trade, but care must be taken to specify clearly, bond and mode of work, and here while upon this trade, may attention be called to the slovenly, careless and sometimes criminal way of erecting scaffolding, and in the majority of cases it is nothing more than a series of death-traps. In a timber country like British Columbia, surely it is possible for a building contractor to provide himself with proper scaffold poles, but probably the system of sub-letting is primarily the cause for this defect.

Mason.—Building stones are the principal item in this trade that it is proposed to touch upon. In a country such as British Columbia, rich in building stones, why are they so limited, and almost impossible to obtain? It is suggested that if private individuals will not open up and work some of the real good building stone quarries, then would it not be well if the government take into serious consideration and formulate some workable scheme, such as subsidizing some of these quarries.

Terra Cotta and Faience Work.—This is a trade that is growing in importance day by day, and the architect must equip himself with up-to-date knowledge on the subject.

Structural Engineer.—Here in this trade or profession the architect must to a lesser or greater degree rely upon his brother professional, the engineer, but the architect should acquaint himself with all the necessary data so that he can readily direct any defects either in material or construction.

Reinforced Concrete and Fireproofer.—This branch of the building trade requires the closest of attention as in the writer's opinion not enough care is taken in seeing that the component materials of the concrete are properly prepared, and many of the failures of so-called reinforced concrete work are solely due to this cause.

Carpenter and Joiner.—This is the trade or trades where so much depends in a building, either in the construction or the decorative finish, and here let attention be drawn to the slovenly way as a rule in which the carpenters' work is carried out. The architect must clearly specify and see that his specification is carried out in regard to scarfings, joints, housings, etc. A conscientious architect is not content with specifying, "an ounce of inspection is worth a pound of specifying." Generally speaking, the seasoning of timber by kiln drying has many disadvantages. It seems to take away the very life of the wood, making it brittle and disintegrating the fibres, consequently lessening the strength of the timber.

The next in importance to the decoration and preservation in the building that requires special care in specifying is the painters work, for the reason that here in Vancouver there seems to be but little preparation for painting work, especially where old work is to be done. No use seems to be made of the dusting brush, cleaning rust and scale from ironwork, or rubbing down. Everything seems to be allowed to "give more body" to the paint, such as dust, dirt, rust, etc.

The [illegible] must specify—and see that it is carried out—such rubbing down with pumice and water, cleaning ironwork for rust, scale, etc., and other preparatory work.

Special care must also be taken when specifying the new painting work, to make it clear that the priming is not a coat of paint but a preparatory measure. Therefore clearly specify in similar terms as the following: "Knot, stop, prime and paint four times in oil color." Again, attention might be called to the clumsy tools used by the average painter. You will often find a brush being used that from its size would be far better used for distempering.

Although the foregoing are but a few of the points which require special attention, yet the specification as a whole requires the architect's closest attention throughout.

In conclusion, may the opening words of this paper be once more emphasized, viz., the specification requires every care, first, as a duty to the client, second, as a duty to the contractor, and third, but not least, as a duty to the architect, himself.

The Good Roads Movement in Europe

THOSE of us who have trodden the main highways of old France and the mountain roads of Switzerland, or who have footed it over the broad flat flagstones of the Italian towns, know what the good roads of Europe mean to Europeans. Doubtless, during the coming summer, a goodly number of Canadians will attend the International Road Congress in London and take advantage of the opportunity to cross the choppy little piece of water between Dover and Calais and pass quickly into a great field for road lore—if they have not already been satiated with a study of the finest roads in the world afforded by Great Britain. It seems to us, therefore, that it is particularly timely to review the road engineering practice of Europe. The following notes are abstracted from an article by Francis Miltoun in the Scientific American, which comments editorially that "the good roads question is one of the biggest on the economic horizon to-day."

It is no retrograde movement that proclaims comfortable travel by road as one of those twentieth century blessings which is our due. It is an axiom that the speedy railway development of the United States worked to the detriment and discouragement of scientific road building. Old Europe suffered under no such handicap. Roads, more or less acceptible were there. Take the case of France as the conclusive, concrete example, because France has the greatest continuity and excellence of good roads to-day—since the Roman invasion, a fact which is evinced by one of the celebrated bornes millieres—the mile stones of the Roman era—which sits beside a tree-bordered Route Nationale not a stone's throw from where these lines are written. The roads of Gaul were planned on grand lines; their great scope even at this late day cannot be denied and proves that they are a tangible expression of planning for the future. French roads of to-day follow these same general lines. It is thus that Europe got her start. What is more remarkable, France, through the application of the same nation-wide governmental and centralized roads control system, has endowed Algeria (in something less than three-quarters of a century) with highways as good as those of the mainland itself. It is not solely then because a country is new that its roads should have been ignored or neglected—not even on the insistence of big business, for as a matter of business itself the good roads question is one of the biggest on the economic horizon to-day.

Influence of the Romans

All this has for long been recognized in France and her famous Ecole des Ponts et Chaussees (which gave the inspiration for the establishing of the highway engineering chair at Columbia University) turns out its road engineers all trained to the same methods. This of itself produces a uniformity of design and treatment which has done much toward putting French roads into the enviable class in which they stand. If a further endorsement of this paternalism were needed it can only be added that the recently founded department of the government, the Office National de Tourisme, is working hand in hand with the road building authorities for the provision of the funds necessary to build new roads which shall open up many hitherto closed regions to a rapidly increasing tourist traffic. This is not by any means an idle catering to the classes of leisure, the spenders; the development of a hitherto inaccessible region to tourists means that all the allied interests, which may previously have languished, will at least become producers able to furnish a more comfortable livelihood for many a mountain community which hitherto eked out a perilous existence or emigrated to the shores of the Seven Seas. It was this combined effort of two friendly governmental departments which brought into being the magnificent Route des Alpes from Lake Leman to the Mediterranean—five hundred miles of superb mountain roadway through the Alps of Savoy and Dauphiny—and which in a like manner is achieving the Route des Pyrenees from the Bay of Biscay to the Mediterranean. The famous Corniche d'Or of the Esterels, too, a magnificent forty kilometer stretch of shelf-like, cliffside Mediterranean, bordering the Riviera, just before Cannes, owes its existence to a like initiative. Formerly it was but a coast-guard's trail; to-day it is the most beautifully disposed and most remarkably engineered roadway extant.

It is remarkable the wide interest that the road question has for all classes in Europe, and it is this unity of purpose that builds on the net-work legacy left by the Romans. Since that time, and that of the Henris and the Louis, to whom were due much of the elements of beauty that compose the French road system to-day, particularly with respect to tree-planting alongside, and since the later day of the military road-making genius of Napoleon much has been undertaken in the way of refinement which has produced, if not an actual money return, at least a prosperity which would otherwise have been unknown.

European and American Roads Compared

To be just there are as good roads in the United States to-day as in France. In top-dressing, in comport with the needs of the new locomotion, according to any one of the four or five methods commonly made use of in America, results are superior even to anything yet achieved in Europe. That these "surface roads" are as durable is a question not for discussion here. The rock-metalled, water-bound macadam of Britain, precursor of the Frenchman, Tresaguet, the pflaster of Germany or the pave of Belgium at their best are certainly no better to the eye, nor in actual practice when seated on rubber tires, than much that may be seen in short lengths in some States of the Union.

Little has been achieved in Europe in the redressing of existing roadways with tar, asphalt, cement or any form of bitulithic carpeting which is known so favorably, in one form or another, in America, and which in most cases has been found superior to purely water-bound road-surfacing. In France, particularly, where the thing has been tried, pitiful results have accrued, notably on certain stretches along the Riviera, that battery of Mediterranean coast towns which has become the playground of princes, American millionaires and some others.

Brick is found on some roads of Holland, but it dates from before the automobile era, before even that famous pavement of Terra Haute, Indiana, owning already to some twenty years and still good. Great claims of durability are made for brick, and if these two examples have any weight, the thing would seem to be worth something.

In France there is a famous forty kilometer stretch of Route National in the south, near Marseilles, just after leaving Avignon and Arles on the road to the Riveria, straight as an arrow, flat as a billiard table and smooth as marble, with a row of wind-break cypresses on the north, which in the writer's opinion is the very nearly ideal roadway. French National Departmental and Communal roads, as a class, are the best in the world. Here and there, it is true, they are showing signs of wear, but the system of upkeep is such that they seldom degenerate into downright bad. From the Channel Ports to Paris there are superb bits of tree-lined roadway, wide well-drained and marvelously engineered, the typical Routes Nationales, which have set the pace for all other main highways of the world. South in Poitou and through the Limousin are long silent stretches nearly as good. In the Pyrenees are found superb mountain highways on the French slope and something unspeakable on the Spanish versant, with the result that Alphonse XIII., Europe's automobiling monarch, does most of his road travel in France. In the French Alps are the finest mountain roads in Europe, far and away ahead of those of Switzerland on all counts. Many of them were due to the genius of Napoleon and his military road builders, and if their main purpose in times past was strategic, to-day they are certainly essentially practical. The Col du Mont Cenis, the Col de Mont Genevre, the Lauterest and the giant Galibier (the highest carriage road in Europe save the Stelvio), at an elevation of a mile and two-thirds, are the best of their kind, though commonly one thinks of the mountain republic of Switzerland or Italy or Austria when mountain roads are mentioned.

The Mountain Roads of Austria

The mountain roads of Austria are a close second, particularly when it comes to considering them from the point of view of the automobile. The country is trying hard to get some of the thirty millions which is claimed to be left abroad each year by foreign automobilists in Europe, and it has accordingly put its mountain roads in shape and opened up many new ones within the last decade, until today there is a continuous round of fifteen hundred miles at no less an elevation than three thousand feet, with many of the passes, like that of the Stelvio, well above six thousand. Autophobic Switzerland is a big loser with its circumscribed system of cantonal option, resulting that it is but a bridge for the "fast traffic" between Paris and the Italian Lakes instead of being the touring ground that it was in the eyes of a former generation. One enters Italy over the Saint Gothard or the Simplon or Tyrol over Arlberg, but a bare three hundred miles of cross country is all that is left to Switzerland on the main touring route, the valleys and many of the interior roads being given over exclusively to carriage and mail coach, horse-drawn traffic of the days of Mark Twain.

Italy has a nationalized roads system, so has Belgium, Austria and most of the German Confederation. The first three meet the situation but partially, organization and control being decidedly inferior to that in France. [illegible] di Grande Communicazione are sometimes good, more often bad, and around Naples, Rome and Florence and north toward the Italian Lakes via Milan they are too bad for words, having arrived at this disgraceful stage through sheer neglect or inattention rather than through any fault in the system of road building in itself. Level crossings, with great well-sweep gates, always shut, abound—there are fifty of them between Vintimiglia and Spezia on the Italian Riviera, the Poor Man's Riviera, so-called to distinguish it from that around Nice and Monte Carlo.

To sum up and bring it home, there is nothing worse in Europe than stretches within half a hundred miles of Manhattan, and nothing quite so good, even in the Bois de Boulogne, as some of the hard-surfaced ribbon roads leading out into the Jersey Hills. Roads in Europe are an economic factor of life and not a fad, however. Recently we read of an army division in the Balkans which made a hundred miles with all its train in a little more than a week, and that truly is going some, even on a first-class open road, and military strategic roads are invariably good roads, though they may not be so numerous or have the extent of those mundane thoroughfares which lead merely from town to town. Neither is the farmer abroad taxed in strength, patience, time or purse. In France he is assured a road grade which will remedy all this just as soon as it becomes really national in its functions and not merely advisory, leaving the county and parish authorities to do pretty much as they please. Towns and villages in England are often so close together that a highway is frequently one long main street—narrow and twisting at that; and the famous Bath Road of history, for a length not appreciably more than a hundred miles, is under control of a dozen different road builders, each with methods of his own. Results are variable. One length of but a few miles, entering London from the west, is under the regime of three different urban councils of greater London. In France, or in any of the continental countries where the national system prevails, this could not be.

Uniform control in France makes a national road of the main street of many a populous town, and as such it is under the direct supervision of the national road building authorities and, as goes without saying, is kept up to national standards, often having a stone kilometer mark set into the facade of the town hall or a Gothic church which may date from the middle ages. It is as if the King's Highway, or Route Royale, from which the French Route Nationale of to-day has descended, were ambling along in the open plain of La Beauce, the granary of France, where, for miles on end, there are nothing but waving wheat fields on either side, no hedgerows, as in England, no paving blocks as in America—nothing but straight, white, smooth-surfaced roadway along which the automobilist may make what speed he may so long as he doesn't hit anything.

Members of the Montreal Builders' Exchange have, by means of a deputation, presented a petition to the Board of Control asking the city to come to an arrangement with the Tramway Company for the carriage of freight. Mr. Quirk, Mr. Gilday, and Mr. R. L. Werry, the secretary, pointed out that the hauling of stone alone was an important matter in the construction work of the city, and unless the transportation of freight was again conceded the builders would be at the mercy of the expensive system of horse teams. Mr. Quirk was of opinion that it was advisable to grant the request, and then endeavor to have an agreement with the company, [illegible] to make the transportation of building material cheaper. The Mayor replied that when the city entered into negotiations with the company for a fresh contract the freight question would be given careful consideration.

Efficiency of Steel Cable Fastenings

IN a recent address before the Philippine Society of Civil Engineers, Mr. Clarence W. Hubbell, chief engineer of the Bureau of Public Works, presented some valuable data on the results of tests made to determine the strength developed under heavy tension by bolted fastenings for steel cables.

During the recent erection of a 340-ft. span suspension bridge one of the 2-inch cables slipped through the clamp and caused a serious accident. As no data on the holding power of the cable clamps were available in the investigation which followed, the Division of Engineering Design made tensile tests with steel cables fastened with clamps of two standard types.

A ⅝-inch six-strand plow steel cable was bent around a thimble and the ends secured to the standing part by a standard ⅝-inch Crosby clip of the U-bolt type, with the nuts drawn as tightly as possible by a 12-inch wrench. The cable slipped under a load of 8,360 lbs. In a second test with a new clip tightened with a 24-inch wrench the cable slipped at a load of 10,020 lbs., and after the nuts were again tightened slipped at 12,380 lbs. In a third test made with two new clips, the nuts were tightened under a load of 6,000 lbs. with a 12-inch wrench, and the load was increased to 21,710 lbs., which broke the cable where it was in contact with the lower U-bolt. As the rated ultimate strength of the cable was 36,000 lbs., it was thought to have been weakened by the distortion under the U-bolt, which was set in contact with the standing part, while the head took bearing on the free end.

A 95-lb. cast iron clamp, 33½ inches long, made in two pieces, with grooves fluted to receive the cable, and connected by five 1-inch bolts having a theoretical holding power of 19,500 lbs., was placed on a 2-inch seven-strand galvanized steel wire cable. The bolts were drawn as tight as possible by one man with an 18-inch wrench, and the cable slipped under a load of 12,000 lbs. The nuts were tightened by one man with a 30-inch wrench and a slip occurred under a load of 12,500 lbs. The nuts were again tightened, and the third slip occurred under a load of 16,500 lbs. The clamp was removed and replaced on the cable in a new position and the nuts tightened by two men with a 30-inch wrench. The cable slipped under a load of 17,800 lbs., and in successive tests under 12,700 and 15,000 lbs. When tightened with three men on the same wrench turning each nut from one-eighth to three-eighths of a revolution, the cable slipped at a load of 19,300 lbs.

A lighter clamp of different design had a groove 1¾ inches in diameter, designed to develop a wedge action increasing the bolt pressure when the clamps were forced together and the cable distorted enough to bear on the bottom of the groove. The clamp was 12 inches long, weighed 47 lbs., was provided with five ¾-inch bolts and had a theoretical ultimate strength of 22,650 lbs. for each half. The bolts were fastened by one man with a 24-inch wrench and no slip was apparent under a 10,000 lb. load. The nuts were tightened and the load increased to 20,900 lbs. without apparent slip. The clamp was removed and found practically uninjured.

It was concluded that, first, where more than one clamp is necessary they should be placed as close together as possible in order that the necessary adjustment of cables to bring them all into action shall be as light as possible; second, the clamp bolts should be tightened from time to time as the load is applied; third, the safe holding power of a cable clamp may be taken at about 3,750 lbs. per square inch of area of the bolts which secure the two halves of the clamp.

Cost of Macadam Highways

E. A. James, B. A. Sc., Engineer York Highway Commission

THE cost of building water-bound macadam roadways varies with local conditions, price of material and thickness of the road metal. During 1912 the York Highway Commission had five day labor gangs at work so that we were able to check carefully construction charges. In this article we give the unit prices on one of our roads, and in the following table the actual cost of construction based on these unit prices.

The cost of construction varies materially according to the season. In early spring and late fall the cost was higher than at mid-summer because the roads were in poor condition for teaming. The prices given are the average cost covering six months.

Steam roller building water-bound macadam

It will be noticed that the costs do not include any charges for depreciation of machinery or maintenance, but they include everything else, even to repairs.

Macadam Road, 8 Inches Thick

10	1,600	$2,667	$1,500	$4,167
11	1,760	2,933	1,650	4,583
12	1,920	3,200	1,800	5,000
13	2,080	3,467	1,950	5,417
14	2,240	3,733	2,100	5,833
15	2,400	4,000	2,250	6,250
16	2,560	4,267	2,400	6,667
18	2,880	4,800	2,700	7,500
20	3,200	5,333	3,000	8,333
22	3,520	5,867	3,300	9,167
24	3,840	6,400	3,600	10,000

Day labor unit prices: Per sq. yd., 71c.; per. cu. yd. $2.61

Cost of building one mile of water-bound macadam road of various widths and depths.

Day labor prices based on the following data:

Cost of labor, 20c per hour.

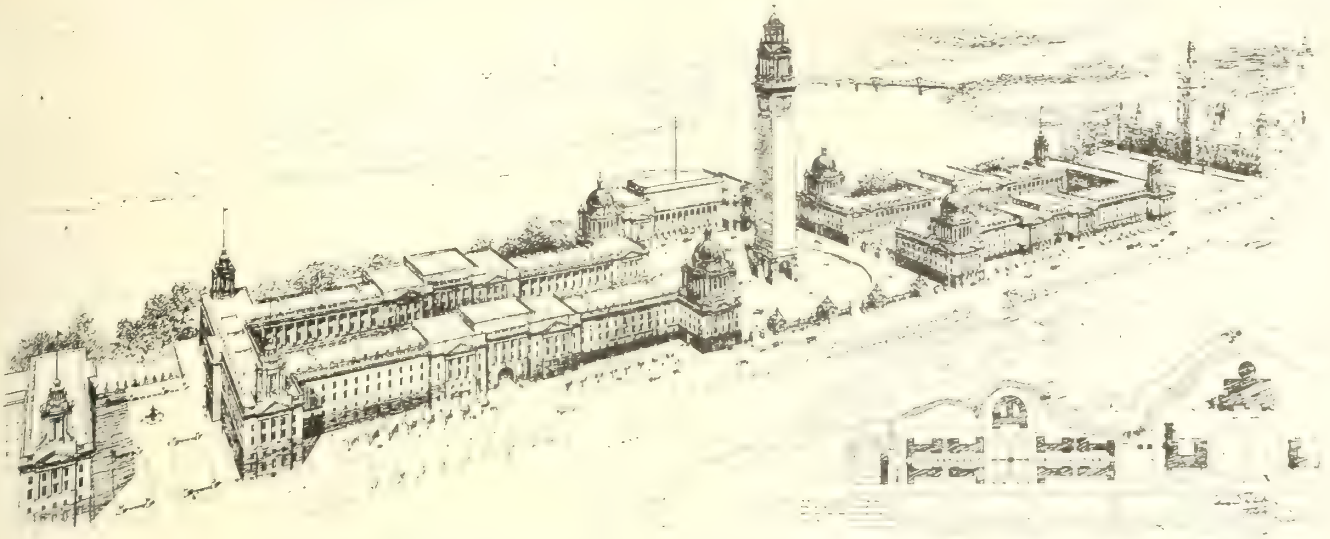
Cost of teams, 50c per hour.

Cost of stone, $1.30 per ton, f.o.b.; $1.69 per cubic yard.

Weight of 1 cubic yard of stone, 2,600 lbs.

Average wagon haul, 1 mile. For longer hauls add 25c per cubic yard a mile.

Total cost in each case includes grading and shaping of road bottom.



Bird's eye view of the proposed new Departmental Buildings at Ottawa.

Proposed New Departmental Buildings, Ottawa

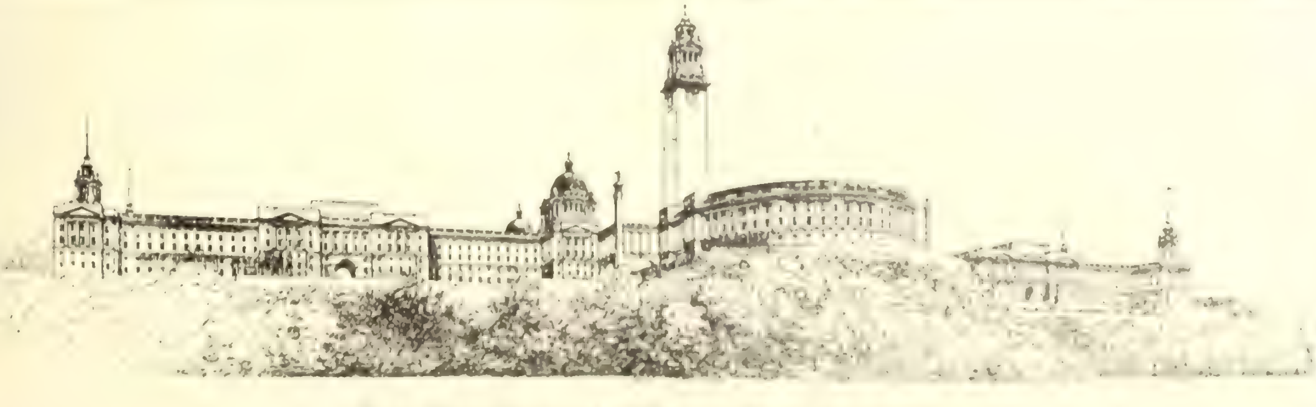
THE illustrations reproduced herewith show the new departmental buildings at Ottawa, which comprise the scheme recently adopted by the Dominion Government. The buildings shown are merely tentative sketches designed for the guidance of British and Canadian architects in a competition that will be inaugurated shortly. The proposed new buildings will house various departments scattered throughout the city and will entail an expenditure of something like four million dollars.

It is of interest to note that the publication of the plans has evoked a considerable amount of unfavorable criticism in the Federal Capital. Mr. C. P. Meredith, one of Ottawa's best known architects, is quoted as having expressed disappointment at the plans and criticised the design as lacking in harmony with the existing structures, the proposed buildings being in the Neo-Classic and the present buildings in the Gothic style of architecture. Mr. Meredith stated that it was not necessary for the new buildings to duplicate the old in style, but impressed the desire for harmony—citing as an instance of such harmony the Chateau Laurier and the new station at Ottawa. The plans had been drawn up without proper consideration of the site. There was no opportunity of vistas of the buildings along the main streets.

The criticism of Mr. W. E. Noffke, also of Ottawa, is that insufficient study is revealed in several details. For instance, he contends that the tower in the centre of the buildings hides the Justice Building and further expresses the opinion that since the classic style has been adopted a dome would be more appropriate than a central tower. The tower should be placed where it would be of value in breaking up the sky-line. The rear elevation is too flat and the small towers on the corner of the wings are insignificant in comparison with the magnitude of the scheme.

Another criticism of the tower was that it had no meaning and that it would be in place only as a structure commemorative of some great event. In regard to the style of architecture it was not essential that the old buildings should be duplicated, as there would be four hundred feet between the two, but there should at least be general harmony and in this the present scheme was entirely lacking.

The plans were prepared by Mr. Edward White, of London, Eng., whose services were secured by the Prime Minister when in England last summer. Mr. White was asked more particularly to suggest a layout for the buildings, his report being supplementary to that of Mr. Frederick Todd, of Montreal. The estimates this session will provide a substantial amount for the commencement of operations.



Rear Elevation, proposed Departmental Buildings

Cost Accounting for the Clay Industry

Satisfactory Cost System in which the Manufacturing End is Divided into Six Departments—Value of Practical Records

By D. C. Haegar

FOR many years there have been discussed, at the conventions, the various problems that are met with in the manufacture of clay products. Those manufacturers who have attended these conventions have received many new ideas about the handling of their clay so that now, most of their manufacturing problems are satisfactorily worked out, and their plants are on a profitable basis.

But conditions have been changing very rapidly during the last ten years in this country, and in many lines of manufacture, profits are growing less each year. In England, profits are so little now that manufacturers are content to even enter into co-operative schemes with their labor, practically letting their labor run the business. There is no question but what the day of large profits is past, and all manufacturers should get closer to the details of their business.

Up to only a few years ago, labor and coal were cheap and the heavy demand, especially for drain tile, kept the few factories hustling to keep up with orders. Prices were good, and the manufacturers were content with their profits, and were not particularly interested in the cost of producing their goods. There is not much skilled labor required in either brick or tile plants, and many factories use the foreign labor that has been coming to this country for many years. However, conditions have improved in their own countries, and foreign immigration is growing less. The native born laborers are educating themselves and learning trades, and soon the manufacturers will have to pay better wages in order to get sufficient labor to operate their factories economically. The price of coal is steadily creeping up, and in many mines, the quality is getting poorer.

Two Ways of Increasing Profits

There are only two ways to increase the profits of a manufacturing business. One is to decrease the cost of manufacturing, the other, to increase the price that the manufactured article is sold for. With the two great expense accounts for the clay manufacturer, labor and fuel, getting larger each year, it seems quite a problem to decrease the cost of manufacture.

The last few years has seen a cutting of prices, especially in the drain tile business, until now the prices are where they were twenty and thirty years ago, when labor and fuel were exceedingly cheap. It seems as though the clay manufacturer is only figuring on the present, and at the present rate, in a few years, there will be many plants that will not be active. The small plant with few kilns, if it has a good local trade will be able to operate, but the medium sized plant, where the owner has to depend upon a superintendent and other help, will not have sufficient local trade, and it will not be equipped to make goods cheap enough to ship any great distance. The large plants, especially those making large drain tile, if properly equipped and managed, will be able to undersell the small plants on the small tile, and make their plants pay on the large tile.

Although the farmer is better able now to pay good prices for drain tile, on account of the rapid increase in farm land values, yet the drain tile manufacturer is asleep and is losing his opportunity to get fair profits. The farmer and dealer are fast becoming educated to low prices, and the chance is slim for increasing the profits by increasing the prices. If lower prices sold more drain tile, the manufacturer might be considered a level-headed business man, but the land requires so many tile, whatever the price is, and the drain tile manufacturer will continue in their philanthropic work, until the clay banks are depleted, and many factories closed down, complete losses. Prices made to-day should allow for a heavy depreciation which will have to be figured on very soon in many localities.

Goods Must be Produced More Cheaply

The natural result will be that the successful manufacturer will have to know what his goods cost him, for it seems to the writer that the profits can be increased, or even kept where they are, only by producing cheaper, and getting better efficiency from the machinery and better results from labor and fuel. But in order to know whether one is getting better results, some kind of cost records must be kept. Not on sheets of paper, to be filed away and figured over at leisure, but a system should be installed at the factory and office that will dovetail with the bookkeeping system and be kept up-to-date every day. To lump expenses and figure costs at the end of the year, after all the profitable or unprofitable business is completed, seems very unbusinesslike and foolish.

The keeping of brick costs is very simple, but in the manufacture of drain tile, say in sizes from 4-inch to 24-inch, it becomes a much more difficult problem. There should not be too much red-tape required in the cost records, and the manufacturer cannot expect to get absolutely correct records. This would require a number of cost clerks and considerable work, and would not be practical. A great many tile makers figure on the tonnage basis, but they cannot tell just where the dividing line is in the cost of producing small and large tile.

Simple Cost System Described

In the cost systems, which the writer uses, the manufacturing is divided into six departments: Power, Clay, Machine, Setting, Burning, and Handling, the latter being subdivided into three operations, that of drawing from Kiln to Stock, Kiln to Car, and Stock to Car. The expense in each department is determined each day, but the general expense such as superintendent, night watch, supplies, etc., is proportioned and added in at the end of the month. Besides, the regular pay-roll book, the superintendent is required to make out a daily labor sheet, giving the name of each laborer, and the time worked in each department. This sheet is figured each day by the clerk in the office, and forms the basis for determining the expense to be charged against the many operations for the different sizes of tile. In the office, a sheet is kept for each size of tile or product made, this being divided into the six departments. The various amounts of tile made, set, burned, or handled are put down each day and the expense figured.

Where motors are in use, the power can be figured daily from the meter and charged against the product made that day. If boilers and engines are in use, it is a simple matter to weigh the coal and get the daily power cost. The factory reports the tons of clay dug each day, and at the end of the month the total expense of the clay department is divided by the total tons dug, and the cost per ton determined. The tons of various products are figured on that basis, and the clay expense for the month is arrived at. The setting is charged to the various sizes according to the number of dryer cars set. All coal used in burning is weighed to the kiln, and a close record kept of fuel used on each burn. A regular kiln report blank is used, showing the goods set, cost of setting, time kiln was fired, watersmoked and finished, labor cost of burning, fuel used, time of cooling, expense of drawing and a check of the No. 1 goods drawn. Attached to this blank, is an accurate time sheet for the setting and also burning labor of the kiln. Where two or more kilns are on fire at once the burners' time is divided and charged on separate burning tickets daily.

Finding Cost of Handling

When one starts out to put in cost systems, he finds it comparatively easy until he gets to the handling department. The total expense cannot be lumped and divided by the tons handled, for some of the goods are handled twice, from kiln to stock and then to car, while some are handled direct. A record is kept by wheelbarrows or trucks of products drawn from kilns, and either put into cars or stock, and the expense is proportioned accordingly at the office. The work of getting all of these factory reports is attended to by one man or clerk who puts in about two hours' work a day.

Before the bookkeeper in the office can close the books for the month he must have the cost basis for each product made. At the end of the month, a burning sheet is made out showing each burn complete with labor and fuel cost, proportioned to each size burned according to the tons of different sizes burned. A general sheet or record is made up showing each size with the expense in each department. When this sheet is completed, there will still be some expense, such as machine repairs, etc., that cannot be put down daily, and which will have to be spread over the various departments. The sum total expense of this sheet will equal the manufacturing expense as shown in the regular set of books, but divided separately for each size of tile made, set, burned and handled. Divide each of these departmental expenses by the number of tile either made, set, burned or handled and the cost per thousand is determined.

In the regular set of books, there are two inventory accounts called manufacturing and finished product accounts. The total manufacturing expense each month is charged to the manufacturing account and the finished goods, figured at the cost basis shown by the cost system, is credited, leaving then the value of the goods in the process of manufacture, and not finished. The amount of the finished goods for a month is charged to the finished product account, and the sales, figured at the same cost price, are credited and charged to the sales account, leaving the value of the finished goods on hand. This arrangement gives one a perpetual inventory.

By watching the manufacturing account, one can tell if the costs are right, for if this account gets smaller each month than the apparent inventory should be, it is a case of using too high costs. After the system is in use a few months, if the cost of some operation such as the burning of 4-inch tile, runs about the same each month, it stands to reason that the system is practically correct.

Many other practical records can be kept, such as a chart showing the daily production of the plant, and the average for the month and year expressed in tons. Other systems are kept showing the efficiency of kilns, and of the plant based on the percentage of time operated. Many new systems can be devised, all of which will be of great assistance in getting to the details of manufacture, and the reducing of manufacturing costs.

There are many benefits to be derived from studying over these costs. If one wishes to put in a piecework system, the records will give all the information necessary for figuring a fair basis. If the clay is changed or a new mixture used, one soon learns from his costs if it is a profitable change to make. The greatest benefit, however, is that the manufacturer has a complete account of all operations of his plant, and should the costs run higher he is notified by the systems and can take immediate steps to stop any losses. In selling, one knows how far he can go, and should competition be very keen, the cost system determines the most profitable product to make, and the manufacturer can increase his profits by having this knowledge.

Winning Design, Moose Jaw City Hall

We reproduce herewith a perspective of the first prize-winning design for the Moose Jaw, Sask., City Hall, submited by Messrs. Jno. D. Atchison & Co., Winnipeg. The second prize was awarded to Messrs. Maw & Drewitt, Toronto, the third to Messrs. Sharp & Brown, Toronto, and the fourth to Mr. Chas. S. Cobb, Toronto. The assessors were Mr. H. H. Bamford, Moose Jaw, Mr. F. S. Baker, Toronto, and Mr. P. E. Nobbs, Montreal. The estimated cost of the building is $225,000. It is designed to meet the requirements of a city of 50,000 people. The present population of Moose Jaw is 25,000.

Prize winning design for the Moose Jaw City Hall, submitted by Messrs. Jno. D. Atchison & Co., architects, Winnipeg.

Proposed 20-Storey Building for Toronto

Architects, Messrs Ross & Macdonald

It is proposed to erect at the corner of Yonge and King streets, Toronto, a twenty storey building on the site of the present Janes Building. It will be the highest office building in Canada. The situation is an excellent one for the purpose, as it is in the centre of the financial and commercial district. Messrs. Ross and Macdonald, architects, of Montreal and Toronto, have prepared the plans and this illustration of the building, and it is anticipated that work will be commenced within the next two or three months.

The plans provide the following accommodation: On the ground floor at street level, offices for brokers or similar interests will be entered direct from Yonge and King streets, each with their own separate entrance. On the next, or principal floor, the whole area will be leased to The Royal Bank of Canada. The design and plan of the banking chamber provides for the main entrance from King street, and another entrance from the office entrance on the east side, thus giving to the tenants on the floors above convenient access to the banking premises. The office entrance leads from King street on the east side to a double bank of six elevators in a spacious elevator and stair hall. These will be operated to run local to the tenth floor and express to the tenth floor and above to the twentieth floor.

Proposed 20-Storey office building for the Corner of King and Yonge Streets, Toronto

The present plans show an arrangement providing four large offices, giving a total area on each floor of about 9,000 square feet, or a total area on the office floors of 162,000 square feet. On each floor ample lavatory accommodation will be provided, and a large vault. Safe-deposit vaults will also be placed in the basement for rental to tenants and others requiring them.

The equipment will include the latest and most improved mechanical and sanitary appliances that can be furnished. The elevator service will have traction type machines and will be quick and absolutely safe. A vacuum cleaning plant is to be installed. The heating will be on the vacuum steam system.

The building will be constructed with skeleton steel frame, terra cotta fireproofing for floors, partitions and furring of exterior walls. The exterior will be faced with Indiana limestone, except the base, which will be gray granite. All exterior doors and the windows throughout are to be of metal, while the finish of floors and walls in the entrance halls and corridors will be of marble. The wood finish throughout will be mahogany except the floors of offices on floors above the banking premises, which will be of maple. The banking chamber will be finished in marble for floors and trim throughout.

Blasting Snow Slides

EXPLOSIVES were recently used with success in removing a heavy snow slide from the tracks of a railroad in the Rocky Mountains. The slide was about 600 feet long and 40 feet deep over the rails. At the time the slide took place the weather was mild and the snow soft, but other slides delayed the arrival of the wrecking crews, and in the interval the weather became very cold and the slide froze hard.

Under these conditions a large crew of men with rotary snow plows made little progress until a Swedish "powder monkey" who was working for some contractors on some heavy construction just east of the slide, suggested that they shoot the slide with blasting powder. The division superintendent was at first rather fearful that such methods might seriously damage the track, but upon being assured that no damage would be done he allowed the men to prepare the blast under the direction of the Swede.

Three 1¼-inch steel bars about 18 feet long were first welded together and then forced down through the snow to a point about 5 feet above the rails. The rods were then withdrawn and the hole thus formed was loaded with four or five cartridges of 40 per cent. dynamite, which when detonated resulted in springing the hole. Sixty-two kegs of blasting powder were then placed in the hole, and when this charge was exploded the snow was blown out to within about 1 foot of the track over a considerable area.

A careful examination showed that the track was in no way damaged. This operation was then repeated at three other points, and with the aid of the rotary plows the slide was cleared in about three hours and the line put in service.

Since that experience this same railroad company has used blasting powder with success and economy in removing other snow slides. The information here given regarding the work has been supplied the Engineering Record by the E. I. du Pont de Nemours Powder Company, of Wilmington, Del.

Canadian Railroad Development

When additions, contemplated have been made to the Canadian Pacific Railway elevator at Fort William, it will have a capacity of 7,500,000 bushels and an unloading capacity of 250 cars in ten hours.

The Canadian Pacific Railway programme for 1913 includes considerable expenditure in Winnipeg. A sum of $1,500,000 will be spent on the Royal Alexandra Hotel and adjoining passenger terminals.

Official figures have been made public by the Premier of Alberta for 1912 which show that there are now 3,020 miles of railway in the province of which 1,034 were constructed during 1911, as compared with 1,668 in 1910. Of this mileage 638 miles have been constructed by the Grand Trunk Pacific.

In a recent interview, President Chamberlin of the Grand Trunk Railway stated that there was no likelihood of a Union Station being built at London, Ont., at any rate for the present. Mr. Chamberlin also said that negotiations were still pending in regard to the purchase of the London and Port Stanley railway.

Latest reports issued by Mr. H. A. Woods, Assistant Chief Engineer of the Grand Trunk Pacific, show that the estimates for construction on the eastern division up to the present time total over $90,000,000 for nearly 2,000 miles of line. Of the whole amount of line under construction in this division the Grand Trunk Pacific are the contractors for some 300 miles.

We learn from an authoritative source that the C. P. R. are encouraging the city of Lethbridge, Alta., in the belief that they will construct a subway under their main tracks on one of the busiest streets of the city. Recommendations have been made looking to the construction of freight sheds and yards to the value of nearly $200,000. The subway, which will be located on Thirteenth Street, will cost about $75,000.

The Grand Trunk Pacific shops at Transcona, the largest railway shops on the continent, were opened a few weeks ago, and work has started in them. The car shops will be completed this summer if present plans are carried out. It is not thought that the foundry will be opened for some time to come. There are numerous warehouses on the grounds, all carefully arranged for the most convenient and systematic arrangement of materials.

It is reported that the contract for the two bridges of the Grand Trunk Pacfic over the Assiniboine, necessary to bring the line from Harte into Brandon, has been let to the Hyland Navigation and Trading company, of Winnipeg, and that the same company has the contract for building the line from Harte into Brandon. Of the two bridges to be built, one will be across the Canadian Pacific Railway tracks near John Abey's farm and the other across the Assiniboine river near the Bright farm.

Mr. Hayter Reed, the manager of the hotel department of the Canadian Pacific Railway, states that it is their intention to increase the size of the hotels at Banff, Galcier Lake, Montreal, and other places. The hotel at Calgary will be ready in about twelve months. Victoria will have a hotel with 335 rooms before the fall, and Vancouver will have another seven hundred rooms. The trade of the hotel system of the Canadian Pacific Railway is constantly increasing, and it is to meet these increases that the company has considered it necessary to enlarge the great hotels along the line.

Application will be made to parliament at the present session for an act to incorporate a company to construct a railway to be known as the Western Canada Railway, to be operated by steam and electricity from Fort Churchill, on Hudson's Bay, through Manitoba, south of Churchill river, and north of Nelson river, to a point at or near Sea Falls, on Nelson river, thence north of Lake Winnipeg, through Saskatchewan to Prince Albert, thence, continuing through Saskatchewan and Alberta in a direct line to Calgary, with power to construct a branch line from a point near Manitoba Lake in Saskatchewan to Edmonton. The company proposes to build and navigate steam vessels to ply between Fort Churchill and other countries.

The work of erecting the new Canadian Pacific Railway elevator on the west side of St. John, N.B., is rapidly going forward, despite the unfavorable weather conditions. The majority of the concrete piers which will form the foundation of the building have been brought up clear of the ground, and the remainder will be completed shortly. This will be a great stride towards the completion of this part of the buildings, it will do away with the necessity of pumping water from the excavations after the tide goes out. It is interesting to note that the water level is fourteen feet above the ground. Five rows or thirty-five piers of the second lift have been completed, and with fair weather conditions the remaining eight rows will be inserted with the next few weeks.

An announcement was made recently by Mr. H. Muskett King, vice-president of the Alberta, Peace River and Eastern railway, which is backed by a strong financial group in Great Britain, that the company will commence construction, immediately the winter breaks, on the first section of its line, from Edmonton to Peace River Crossing. The company has the route approved by the Minister of Railways from Cochrane in Southern Alberta to Peace River Landing and will eventually build to Fort Murray and thence easterly to Fort Churchill on the Hudson Bay and westerly through Peace River to the Pacific. "As soon as we are well advanced with the construction on the first section of the line to Peace River Crossing, we shall apply to the Minister of Railways for approval of our route to Fort McMurray," said Mr. King.

During the year 1912, three hundred and forty miles of new track, exclusive of second track and sidings, was laid on the line of the Grand Trunk Pacific. As a matter of information, it is interesting to know how this amount of mileage was spread over the lines of the system in Western Canada. On that portion of the line east of Prince Rupert, there was completed thirteen miles, bringing the completed line to Skeena River Crossing; 26 miles of track was laid on the main line, bringing the completed line west from Winnipeg as far as Fraser River; on the Regina branch 110 miles of new track was laid; 49 miles between Oben and Battleford and five miles between Battleford and Cut Knife; 60 miles on the Tofield-Calgary branch, this extension completing 165 miles on this branch, the line now running as far as Irricana; on the branch running southwest from Biggar, 35 miles have been completed; on the North Regina-Moose Jaw branch, 34 miles and nine miles on the Coalspur to Minehead branch. In addition to the above, it may be said that 721 miles of [illegible] steel, [illegible] [illegible] miles [illegible] at the end of the year.

The Board of Control of the city of Hamilton, Ont., recently decided to make a grant of $[illegible] towards the proposed concrete highway between Toronto and Hamilton. The counties through which the road will pass have agreed to contribute $150,000 of the cost, and it is expected that Toronto will donate $125,000

Mainly Constructional

The News in Brief—From Coast to Coast

The Board of Works of the city of London, Ont., are advertising for a city engineer.

The Board of Control of the city of Toronto are considering the building of workmen's homes.

The new Canadian Pacific Railway building at Toronto will be formally opened on March 1st.

An eight-storey mill construction hotel building is to be erected on Hastings street, Vancouver, at a cost of [illegible]

The South Vancouver health committee has recommended the council to install two garbage incinerators at a cost of $60,000.

The annual meeting of The Engineers' Club of Toronto will be held at 96 King street west at 8.15 p.m. on the evening of February 6.

Building operations are expected to be started shortly on the $350,000 Y. M. C. A. building at Vancouver. Mr. S. H. Griffith is the architect.

A large number from all over Canada is expected at the convention of the Canadian National Association of Building Trades, which will be held in Calgary on February 18-20.

A twenty-nine-roomed school building is to be erected in East Toronto, at a cost of $160,000. The basement will be raised so as to admit plenty of light.

The Superior Brick Company, Fort William, Ont., are busily erecting their buildings and expect to have the plant working to full capacity in the summer.

City Engineer Rust, Victoria, is anxious to have a new survey taken of Victoria city, but it is feared that the present finances of the city will not permit of this.

The city of Winnipeg is starting operations at once on the work of extending the sewer system. Very bad conditions exist at present in the far northwestern part of the city.

The Burnaby council has awarded paving contracts to the Canadian Mineral Rubber Company, amounting to $334,000. The government, it is understood, will pay half of the cost.

The second annual convention of the British Columbia Road Superintendents will be held February 10-15. Victoria, Vancouver and New Westminster will be visited by the members.

The Canadian General Electric Company, Limited, and the Canada Foundry Company, Limited, have removed their Montreal offices to 162 St. Antoine street west from 81 St. Peter street.

The Cedar Valley Brick Company, Limited, Toronto, have secured twenty-five acres of high grade shale at Appleby, Ont., and are erecting a plant there which will have a capacity of 100,000 bricks a day.

Plans have been outlined for the new harbor improvements at Hamilton, Ont. They will embrace a period of many years and it is expected that the total cost will be in the neighborhood of $3,000,000.

Improvements to cost $2,000,000 were recently passed by the Works and Waterworks Board of the city of Regina. Of this figure $585,000 was required for paving, $461,000 for sewer work and $421,000 for water mains.

Arrangements are well advanced for the Annual Convention of the Ontario Good Roads Association, which is to be held in the Machinery Hall at the Toronto Exhibition Grounds, February 26-28.

Plans will shortly be drawn up for the new sugar refinery at St. John, N.B., and work is expected to be started as soon as the plans are approved. The cost will be about $1,750,000.

Mr. T. Aird Murray, consulting engineer for the city of Fort William, on the waterworks system, expresses the opinion that tunnelling is the only practical method for their requirements and estimates the cost at roughly $75,000.

A million dollar hotel, the Royal Connaught, is to be erected at Hamilton, Ont., on the site of the present Waldorf Hotel. Local capitalists and the United Hotel Company are financing the deal.

The J. H. McKnight Construction Company, Toronto, have removed their offices from Bay street to their yards at 88 St. David street. They have commenced operations on the Earlscourt outlet contract.

A deputation from Middlesex, Ont., waited on Hon. Dr. Reaume, recently, and asked the government to contribute towards good roads in the county, on which this year there is an anticipated expenditure of $100,000. Consideration was promised.

Government insurance for workmen in Manitoba was adopted as a principle by both employers and employees at a recent conference in Winnipeg of representatives of the Board of Trade, the Builders' Exchange and the Trades and Labor Council.

The Board of Control of the city of Ottawa have prepared a series of questions relating to their water supply, which they will ask Sir Alexander Binnie and Dr. Houston, the eminent English water experts, to give them full information upon.

The H. E. Talbott Company, of the Soo, have been awarded the contract for the construction of a 1,500-foot dam and the installation of a complete hydro-electric system at Grand'Mere, Que. Power will be furnished to local industries and to Montreal.

The International Sand, Lime, Brick & Machinery Company, with headquarters at Montreal, have purchased a site at Guelph, Ont., where they will manufacture sand, lime, brick and artificial stone on a very extensive scale. A plant will be erected early in the spring at a cost of $90,000.

The approximate total cost of the trunk sewers for greater Vancouver will be somewhat in excess of $10,000,000, half of which sum will be required within five years. It is anticipated that the whole project, involving a trunk sewer for every five hundred acres, will be finished by 1950.

Members of the Vancouver Chapter, British Columbia Society of Architects, met with the building committee of the school board of Vancouver recently and submitted a proposal to abolish the office of school architect and instead leave all architectural work open for competition.

Mr. J. A. M. Aikins, M.P. for Brandon, introduced a bill in the House recently which has for its main purpose the conservation for the people, especially of the three prairie provinces, of the enormous water powers which exist on the many rivers. The bill is entitled "An Act to amend the Dominion Lands Act."

A Glasgow firm which tendered for a large quantity of water pipes for the Montreal City Council through its Canadian agent, neglected to forward the necessary covering cheque. The Board of Control therefore rejected the bid, the Mayor intimating that it was useless to tender under such circumstances.

The Quebec Government have been asked by a deputation to construct two new roads, one leading from the Victoria Bridge to Longueuil, through St. Lambert and Montreal South, and another from the Town Hall at St. Lambert to Greenfield Park. It was asked that the roads should be of concrete and at least thirty feet wide.

Mr. A. Hunt, head draughtsman for Messrs. Sproatt & Rolph, architects, recently left for England to acquire ideas for the Peterborough factory of Messrs. Henry Hope & Sons. Mr. Hunt will visit the parent factory in England and upon his return will incorporate the best ideas in the plans for the Canadian establishment.

The contract for the supply of $300,000 worth of water pipes to the city of Montreal will go to R. D. Wood & Company, Toronto, at $37.25 a ton, for 8, 10 and 12-inch pipe, and $36.25 a ton for 36-inch pipe. The Canada Iron Corporation made a protest against the awarding of this contract to Messrs. Wood & Company on the ground that they have no factory in Montreal, but the Board of Control ignored the objection.

When certain outlying wards of Montreal were annexed to the city, exemptions were made in the matter of building laws, but Montreal is gradually extending its provisions, and in about three years these wards will have to conform to the by-laws. At the instance of the Council, Bordeaux has come within the regulations, which prohibit the building of wooden houses with clapboard exteriors and demand the encasing with brick or similar materials of houses with wooden frames.

Requesting a franchise for a central steam heating system in Toronto, representatives of the Dominion Steam Heating Company waited on the Board of Control recently. They propose to start in the down-town district and transmit steam through a network of underground pipes to heat business buildings. They would also install systems in residential districts where there was sufficient business. The board decided to get a report from Works Commissioner Harris.

Yet another new brick company has been formed—the Domestic Brick and Tile Company, Limited, the capital being $352,000. The company have secured 188 arpents of land at Laprairie, P.Q., and plans have been prepared by Mr. P. Giraudet, superintendent, for a plant of an initial capacity of 120,000 bricks per day, which can be extended to produce 350,000 bricks per day. It is proposed in the future to manufacture terra cotta, pressed, enamelled, and all fancy, colored, and moulded bricks.

A deputation from the Society of Stationary Engineers waited on Hon. Jas. S. Duff, Minister of Agriculture, recently, to renew the request made last year that the government adopt graded standards in the examinations for stationary engineers' certificates. Under the present system, it was pointed out, only one class of certificate was issued which placed all engineers on a par. This, it was contended, was not fair, as there were men of varying degrees of ability, and they should not all be classed alike. Mr. Duff promised to take the matter up.

The Siemens Company [illegible] recently [illegible] an order for a 5,000 kv.a. 3-phase, 60 cycle, 1,800 r.p.m. turbo generator for the city of Edmonton. This machine will be direct coupled to a Willans & Robinson [illegible] manufactured in England. The generator will be provided with Siemens system of axial ventilation so arranged that the hottest temperature in the machine can be measured. The rotor will be of the solid type. In addition to the above generator the Siemens Company have already supplied or have on order for the city of Edmonton:—1 2,000 kw. turbo generator; 1 750 kw. street railway generator; 1 425 h.p. induction motor.

The convention of the Alberta Association of Architects was held at Edmonton recently and a good attendance of members was recorded. A satisfactory business session was held, at which papers were read by Messrs. W. D. Cromarty and G. H. McDonald, both of Edmonton. A banquet, at which a number of distinguished visitors were present, had been provided for the guests. After the banquet the remainder of the evening was devoted to music and social intercourse. The following officers were elected: President, Mr. R. W. Lines, Edmonton; hon. president, Mr. G. M. Lang, Calgary; first vice-president, Mr. Jas. Henderson, Edmonton; second vice-president, Mr. J. J. O'Gara, Calgary; hon. secretary, Mr. W. D. Cromarty, Edmonton; hon. treasurer, Mr. G. H. McDonald, Edmonton.

The Court of Appeals, Montreal, has given judgment in reference to the liability of councils under paving contracts. The plaintiffs, Brunet and others, sought recovery of $60,000 from the Montreal City Council, being profit which they contend they would have made on certain paving material if the contract had been carried out. The council ratified the recommendation of the Roads Committee but in granting the plaintiffs the contract stipulated that the material should be supplied as it was needed in different parts of the city. There were no specifications of the total amount. The City Council later reconsidered the contract, which automatically lapsed. Mr. Justice de Lorimier found for the council, and this judgment has been affirmed by the Court of Appeals. Both judges were of opinion that though the city had bound itself to procure the paving material mentioned from plaintiffs, "as it was needed," it had not thereby bound itself to "need" such material. In other words, the agreement of contract was an hypothetical one, the fulfillment of the conditional portion being an essential.

The original plans for the enlargement of the Chateau Frontenac, Quebec, have been changed, and the addition will now be built from the gateway to the wall adjoining the Militia Department, where a large archway will form the entrance. Inside the square will be a large horseshoe building, which will contain the rotunda and other public rooms, connections being made from it to the remainder of the hotel by several elevators. The floors will be made level and many of the stairways in the various wings will be removed. The present arch bridge, which connecte the main part of the building and the two additions, will be replaced by a martello tower, 14 storeys high. Two other towers will be built to correspond with this and the present one, all having 14 storeys. In addition to the spacious dining room, which will hold nearly a thousand guests, there will be a banquet hall, occupying two storeys, with a balcony, and it is expected that the work will be commenced shortly on the excavation and that the new wing will be completed for the spring of 1914.

The "Grip Tight" Floor Sleeper Anchor

The Steel Floor Sleeper Anchor Company, [illegible] have sent us particulars of the "Grip Tight" Floor Sleeper Anchor, a new method of anchoring wood sleepers in concrete, patented in Canada, Great Britain and the United States. The old method of fastening wood sleepers to concrete by the installation of cinder filling has not been satisfactory and the new anchor is designed to be independent of the filler, if necessary. The method is exceptionally valuable where an air space is required. The reasons adduced in favor of using the anchor are, that a secure anchorage is obtained without [illegible]; the cost of the cinder filler is saved and the floors are lightened; the expense of bevelling the sleepers is eliminated, also the time of laying and levelling; a valuable air space is provided where required. [illegible] and other particulars may be obtained on application to the Steel Floor Sleeper Anchor Company, 2 College Street, Toronto.

Personal Mention

Mr. James Scott, local engineer for the waterworks of the city of Winnipeg, died there recently.

Mr. W. S. McCulloch has been appointed assistant engineer of the Montreal division of the C. P. R., with headquarters at Montreal.

Lt.-Col. Anderson, C.M.G., Chief Engineer, Department of Marine and Fisheries, Ottawa, has just returned from a visit to Panama and the West Indies.

Mr. George Craig, recently City Engineer of Omaha, Neb., has been appointed City Engineer of Calgary at a salary of $5,000, and Mr. A. Fox, of Minneapolis, formerly of London, Eng., has been made Waterworks Engineer.

Mr. David Molitor, of the engineering staff of the Panama Canal, will address the University of Toronto Engineering Society on the afternoon of Wednesday, February 12. The lecture will be illustrated by upwards of one hundred lantern views. Excellent accommodation has been secured and all interested are invited to attend.

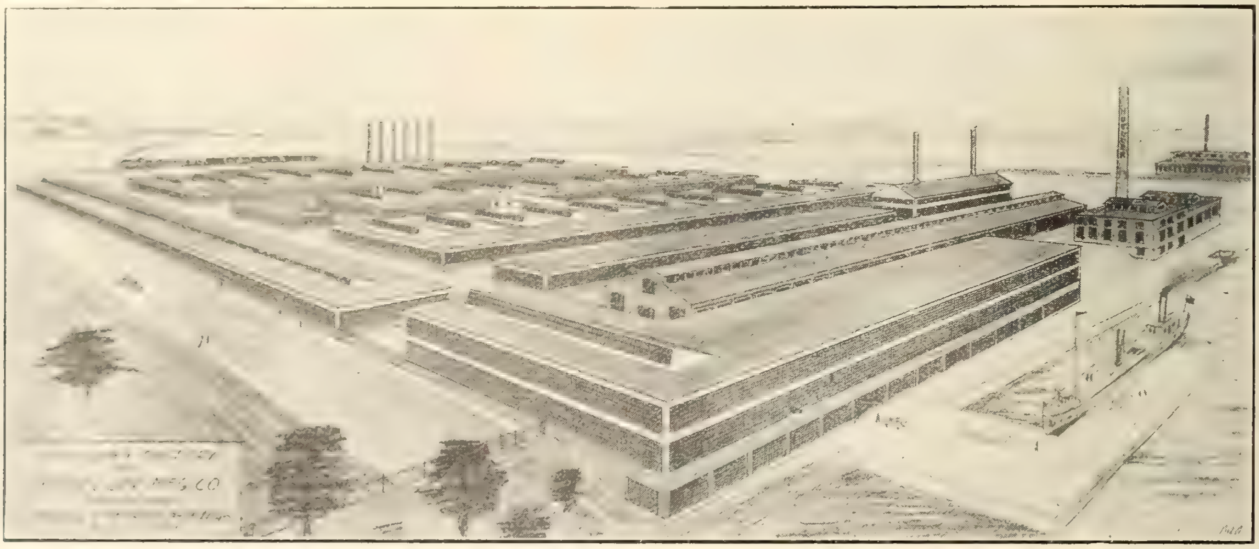
Mr. C. H. Rust, city engineer of Victoria, and a past president of the Canadian Society of Civil Engineers, was elected a vice-president of the American Society of Civil Engineers at the recent convention of that body held in New York City. It is of interest to recall that Mr. Rust is also a past president of the American Society of Municipal Engineers.

Mr. John H. Sullivan, one of the oldest civil engineers and land surveyors in Canada, has died in Valleyfield, P.Q. Mr. Sullivan, who was born at St. Catherine, Portneuf, did a large amount of engineering work, including the survey of the boundary line between Quebec and Ontario. He was in charge of the Lake St. John Railway exploration survey in 1870, and he represented the Public Works Department in 1886 on a special survey in Manitoba. Mr. Sullivan was four times Mayor of Valleyfield. Two of the sons are in the employ of the Corporation of Montreal—Mr. Eugene Sullivan is engineer in charge of the city aqueduct enlargement, and Mr. Arthur Sullivan, land surveyor of the Public Works Department. Mr. Alfred Sullivan is civil engineer in the employ of the Grand Trunk Pacific Railway.

The Mannesmann Tube Company, Limited, Montreal, has just been incorporated. Mr. Henry Munderloh, of Munderloh & Co., Ltd., Montreal, is President of the company, and Mr. Theodor Steltmann (who was formerly South African representative for the Mannesmannrohern-Werke) is sales manager of the new concern. The Mannesmann steel spigot and faucet pipes have been used very extensively in Canada during the last few years; notably in Vancouver, Victoria, Penticton, Esquimalt, Swift Current, Lethbridge, Medicine Hat, Fort Frances, Wallaceburg, Berlin, etc. Munderloh & Company have hitherto acted as sales agents in Canada for the Mannesmann products, and the agency will now be taken over by the new company.

The Peerless Water Heater

In most houses, shops, and stores, it is desirable, especially in the summer time, that an economical and speedy method of obtaining supplies of hot water, be installed. The outfit should be simple, reliable, and ready for immediate use. All these qualities are claimed for the Peerless combination range boiler and gas water heater, which is marketed through contractors, plumbers, and gas companies. The apparatus has only three parts—disc, burner, and shell, and an actual efficiency of 98 per cent. is obtained. The boiler is of galvanized iron and is tested to 200 pounds hydrostatic pressure.



The exterior of the Peerless resembles an ordinary kitchen boiler. The heating equipment, consisting of two burners, is at the bottom, and in operation the heat generated in the burner strikes a water spreader or disc and passes directly into the water, causing it to circulate. The disc is used for the purpose of spreading the water; it also prevents the flame from coming in direct contact with the bottom of the boiler, thus protecting it against the gas flame. The cold water is carried to the bottom of the disc through the pipe and comes instantly in contact with the hottest part of a boiler, just above the flame. It is quickly heated and rises as it warms, through a centre tube to the top of the heater. The heat, after passing around the disc, continues all the way up through the centre of the boiler. An auxiliary burner, when lighted, will keep the water heated and in circulation any length of time. It is claimed that it will give hot water in two minutes and reduce the cost of a bath to one and a half cents for fuel used in heating. In winter it can be connected with a furnace and in summer will operate with gas independent of all other connections. It can be used with special apparatus for gasoline or natural gas. The office of the Peerless Heater Company, Limited, is New Birks Building, Montreal.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Amherstburg, Ont.
Filtration plant planned by town council. Clerk, G. E. Pulford. Estimates to be prepared and work to start as soon as possible.

Cobalt, Ont.
Kerr Lake Mining Co., Crown Reserve Mining Co., and Drummond Mining Co., propose to pump out Kerr Lake at rate of 4,000 gallons per minute. Required two pumps, centrifugal type, two of 2,000 gallons capacity, or one of 1,000 gallons and one of 3,000 gallons capacity, estimate head to pump about 15 engines, hydraulic machinery, hose, piping valves, meters, boilers, pipe clamps, concrete construction, sewerage pumps, air pumps and appliances. Submit proposals to H. J. Stewart, general manager Crown Reserve Mining Co., Cobalt, Ont.

Hamilton, Ont.
Electric pumping station, cost $16,000. Architect, W. A. Edwards, 2 Hughson street South. Tenders received by Mayor, John Allan, until Feb. 11th. Cement foundation, reinforced concrete and brick construction.

Waterworks extension, 12-inch flanged pipe high pressure, 12-inch bell and spigot pipe high pressure, 12-inch, 16-inch and 24-inch special castings for high and low pressure service.. Planned by city council. Mayor, John Allan. Engineer, A. F. Macallum. Tenders received by Mayor until Feb. 18th. Forms of tender at City Hall.

Niagara Falls, Ont.
Brick pavement, Victoria avenue, planned by city council. Clerk, W. J. Seymour. Engineer, J. C. Gardner. Tenders will be called about the end of February.

Petrolia, Ont.
Extension to sewerage system planned by town council. Mayor, Ed. Pollard. Chairman Board of Works, Ald R. Stirrett. Sewers on Maude, Huggard and West streets and Dufferin avenue.

Point Grey, B.C.
Sidewalks and roads planned by municipal council. Clerk, G. C. Heighway, Kerrisdale, B.C. By-law passed to raise $200,000 for roads and $10,000 for sidewalks.

Sewerage, cost $740,000, planned by municipal council. Clerk, G. C. Heighway, Kerrisdale, B.C. By-law passed.

Sarnia, Ont.
Tenders will be received until March 15 for supply of material and construction of pumping station, etc. Plans, specifications, etc., at office of H. G. McLean, Town Engineer, Sarnia and office of Chipman & Power, Toronto. Dr. J. A. Bell, Mayor. Dr. W. A. Henderson, chairman Fire and Water Committee. See advertisement in Tenders and For Sale Department of this issue.

Saskatoon, Sask.
By-law will be submitted on Feb. 11th, 1913, to raise $20,000 to fireproof pumping station. Clerk, Andrew Leslie.

House sewer and water connections, cost $70,000, planned by city council. Clerk, Andrew Leslie. By-law will be submitted on Feb. 11th.

Pavements, cost $140,000, on 1st avenue, 24th street, Ontario avenue, Alberta avenue, Wall street, 20th street, 19th street, Avenue B, Broadway, Alberta avenue. Approximately 45,000 square yards in all. Work is under the consideration of the city council. Clerk, Andrew Leslie.

Opening parks and streets, etc., cost $100,000, contemplated by city council. Clerk, Andrew Leslie. By-law will be submitted on Feb. 11th, 1913, to raise $100,000 for purchase of necessary land.

CONTRACTS AWARDED

Ottawa, Ont.
High pressure pumping station, cost $20,000, Slater street. Clerk, J. Henderson. Architect, F. C. Sullivan, Castle Building. General contractors, Alexander & Campbell, Rideau street. Solid brick construction, felt and gravel roofing, laboratory fittings. Foundations in.

Point Grey, B.C.
Gate valves, cost $7,153.80. Clerk, G. C. Heighway, Kerrisdale, B.C. General contractors, Carter, Dewar Crowe Co., Ltd., 837 Hastings street West, Vancouver, B.C. For furnishing the municipality with Chapman Gate valves.

Railroads, Bridges and Wharves

Province of Alberta.
Railroad. The Peace River & Eastern Railway Company will start work on the first section of line from Peace River to [illegible] Vice-pres., H. Muskett King, Edmonton, Alta.

Ancaster, Ont.
Repairs to dam contemplated by [illegible] etc., required.

Belleville, Ont.
Station on Pinnacle street, contemplated by Grand Trunk Railway. Supt., H. F. Coyle, Belleville. Plans will be prepared.

Burnaby, B.C.
The B.C. Electric Railway Company, 425 Carrall street, will erect large street car repair shops.

Farnham, Que.
C. P. Rly. has been authorized to construct bridge No. 36.5 Farnham Subdivision, Eastern Division.

Hamilton, Ont.
Station and railway extension, cost $3,000,000, for Toronto, Hamilton and Buffalo Railway. Superintendent, E. J. Ebers. Engineers, Westinghouse, Church, Kerr Co. Plans in progress.

Islington, Ont.
Double tracking railroad planned by C. P. Rly., head office, Montreal, from Islington to Woodstock. Engineer, W. Tapley, London. Work to start as soon as possible.

Kingston, Ont.
Kingston & Pembroke Railway Company have been authorized to construct bridge No. 44.86.

London, Ont.
Cement platforms palnned by C. P. Rly., to be laid around stations and approaches, one 450 feet long. Engineer, W. Tapley.

New Westminster, B.C.
Railroad. The Western Canada Power Co., 198 Hastings street West, Vancouver, will build line 17 miles long between Stave Lake and Pitt River for hauling logs to the river. It will later form a part of the electric line planned between Vancouver and Mission City.

Niagara-on-the-Lake, Ont.
Breakwater planned by Dom. Govt., Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Wall will be built to protect shore and historical fort.

River du Loup, Que. (en hant)
Lock and dam contemplated by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Saskatoon, Sask.
Extension to street railway system, cost $100,000, planned by city council Clerk, Andrew Leslie. By-law to be submitted on Feb. 11th, 1913.

Toronto, Ont.
Roundhouse and sidings, cost $2,500,000. The Canadian Pacific Railway Company has had plans prepared for a large roundhouse and 24 sidings. Work to start shortly.

[illegible] shop and extension to [illegible] foot of Spadina [illegible] contemplated by G. T. R. Resident Engineer, F. G. Hewson. Plans prepared.

CONTRACTS AWARDED

Provinces of Alta., Sask. & Man.
[illegible] construction for C. P. R. Contractors, J. D. McArthur, 204 McArthur Building, Winnipeg, for double tracking Kemnay to Virden line 41 miles, also for new line, Snowflake west 9 miles. Foley, Welch & Stewart, [illegible]

[illegible] street, West Vancouver, for double tracking lines from Virden to [illegible] and [illegible] to Shephard 40 miles, also new line from Weyburn to Lethbridge 145 miles, to be done jointly with [illegible] of [illegible], and [illegible] to Rivertown 22 miles. Janse Bros., Calgary, and [illegible] & Hughes, Spokane, Wash., for double tracking Chaplin to Jarva line 60 miles, also new lines from [illegible] to [illegible] miles, Empress to Bassano 118 miles, and Coronation north 24 miles. Geo. Webster, 445 Granville street, Vancouver, new lines Anglia north 30 miles, Kitlaw north 25 miles, Sterling east 25 miles.

Moncton, N.B.

[illegible] to [illegible] car repair shop. Dom. Govt. Dept. of Railways and Canals (I. C. R.). Secretary, L. K. Jones, Ottawa. General contractors, Rhodes Curry Co., Amherst, N.S.

Providence Bay, Ont.

Extension to wharf, cost $21,000, Manitoulin Island. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, E. V. White.

Windsor, Ont.

Wharf, cost $47,000. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, A. E. Ponsford, 605 Talbot street, St. Thomas. Concrete superstructure.

Public Building, Churches, Schools, etc.

Aylmer, Ont.

Public building. Tenders received by Secretary, R. C. Desrochers, Ottawa, Dom. Govt. Dept. of Public Works, until Feb. 17th. Plans, specifications, etc., at Post Office London, Post Office Aylmer, and Dept., Ottawa.

Beauport, Que.

Public building planned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly .

Esquimalt, B.C.

Town Hall contemplated by town council and a committee of the town council has been appointed to inquire into the proposition. Clerk, Thos. Shepherd.

Frankford, Ont.

Church contemplated for Methodist congregation. Pastor, Rev. J. Batstone. Plans will be prepared.

Goderich, Ont.

Addition to Collegiate Institute, cost $7,000. Secretary, Dr. W. R. Holmes. Architects, Chapman & McGiffin, 59 Yonge street, Toronto. Tenders will be called shortly. Two storeys, 52 x 45, stone foundation, electric lighting, hot water heating, seating, new chemical class room.

Haileybury, Ont.

Court house and jail, Ferguson avenue, grey stone and brick construction, for Prov. Govt. Dept. of Public Works. Secretary, H. F. McNaughton, Parliament Buildings, Toronto. Architect, Mr. Heaks, c/o Dept., Parliament Buildings, Toronto, is preparing plans.

London, Ont.

Clubhouse, cost $6,000, for London Jockey Club. President, J. Counsell, Mountain Top, Hamilton. Two storeys, 40 x 55, stone and cement foundation, pressed brick construction. Plans will be prepared.

School, on Hamilton road, Ealing, contemplated by the School Board. Chairman, Geo. Poad. One storey, 35 x 40, stone foundation, white brick construction. Plans will be prepared.

Matane, Que.

Public building planned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Montreal, Que.

Theatre and hotel contemplated by a Syndicate. Site has been purchased at the northeast corner of St. Catherine and Cadieux streets, and plans will be prepared.

Mount Dennis, Ont.

School, cost $24,000, is contemplated by the Board. Chairman, G. W. P. Hood. Plans will be prepared.

Ottawa, Ont.

Addition to Rideau Hall planned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Patrol signal system, cost $30,000, contemplated by ity council, police department, Chief Ross.

Paris, Ont.

Parish hall, cost $7,000, for St. James church congregation. Chairman, Rev. C. Purton. Architects, Taylor & Taylor, Hope Chambers, Brantford. One storey, 45 x 38, stone and cement foundation, white brick construction. Plans ready.

Peterboro, Ont.

Rifle range. Dom. Govt. Dept. of Militia and Defence. Deputy Minister, Eugene Fiset, Ottawa. Tenders addressed to the Director of Contracts Militia Headquarters, Ottawa, will be received until noon Feb. 10th. Plans and specifications at the office of officer commanding 2nd Division, Toronto, Director of Engineer Services, headquarters, Ottawa, and City Clerk, Peterboro.

Prince Albert, Sask.

Labor temple, cost $25,000. The labor council have decided to erect tempel on site already purchased, and plans will be prepared.

Prince Rupert, B.C

Church, 5th and Yong streets, planned by the congregation of the First Baptists. Tenders received by Secretary, J. H. Rogers.

St. John, N.B.

Infirmary planned for Catholic Diocese (Sisters of Charity), Bishop Le Blanc, Waterloo street, St. John. Architect, F. Neil Brodie, 42 Princess street. Tenders will be called shortly. Three storeys, 104 x 38, concrete foundation, brick construction, stone trimmings, electric lighting, plumbing, 1 passenger elevator.

Saskatoon, Sask.

Buildings on Forest Nursery station. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Superintendent and foreman's residences, packing house, workshop, implement shed and stable, on the Forest Nursery station. Plans, specifications, concrete, stone and brick construction, etc., at Dept., at the office of W. T. Mallard, Clerk of Works, Regina, Sask., and the Superintendent of Forest Nursery station, Saskatoon. Tenders received by Secretary until Feb. 24th, 1913.

Mortuary, cost $8,000. Main buiIuing, 41 x 24, gothic style, Ignace granite construction, limestone trimmings, equipment, seating, etc., required. Chairman, Rev. E. B. Smith. Architect, H. J. Payton.

Incinerator, cost $70,000, planned by city council. Clerk, Andrew Leslie. By-law to be submitted on Feb. 11th, 1913.

Municipal store house planned by the council. Clerk, Andrew Leslie. By-law to be submitted on Feb. 11th, to raise $20,000.

Home contemplated for The Children's Aid Society. By-law will be submitted on Feb. 11th, 1913, to raise $12,000 to purchase site for building.

Thedford, Ont.

School, cost $6,000, contemplated by the town council. Clerk, Wm. Brooks. One storey, 35 x 45, stone and cement foundation, white brick construction. Plans in progress.

Toronto, Ont.

Atlerations to theatre, cost $4,000, Bloor and Gladstone avenue, for J. M. Cowan (in trust), 65 Adelaide street east. Two storeys, 22 x 120, structural steel, brick construction, brick foundation, felt and gravel roofing. Plans drawn.

Postal Station "G," cost $200,000, Queen and Saulter streets. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Three storeys, 60 x 32. Plans prepared.

Old folks home, cost $25,000, Industrial Farm. Mayor, H. C. Hocken. Architect, G. F. W. Price, City Hall, has prepared plans. Work to be done by day labor. One storey, fan shaped building.

Work shop, cost $3,000, Elizabeth street, for Trustees Toronto General Hospital, College street. Architects, Darling & Pearson, 2 Leader Lane. Cement foundation, brick construction, concrete floors, metal sash and lath. Plans drawn.

Victoria, B.C.

Schools planned by Board of Education. Secretary, W. T. C. Pope, 1127 Catherine street. Architect, C. E. Watkins, Green Block. Eight room building on North Quadra street, $40,000. Eight room building in Hollywood, $85,000, extensions to Bank street and Sir James Douglas Buildings, $51,000, New Hillside Building, $46,000, manual training and domestic science buildings at South Park, Bank street and Victoria West schools to cost $20,000.

Walkerton, Ont.

Library, cost $10,000, planned by town council. Secretary Library Board, Wm. B. Thompson. Plans will be prepared shortly.

Weedon, Que.

Post office. Tenders received by Secretary, R. C. Desrochers, Ottawa, Dom. Govt. Dept. of Public Works, until Feb. 17th. Specifications, etc., at Post Office, Weedon. Dept., Ottawa, and MacLean Daily Reports, Toronto, Ont. Cement foundation, reinforced hardwood floors and finish, plate glass, plumbing, electric lighting.

Winnipeg, Man.

School, cost $15,000, Polson avenue, planned by East Kildonan School Board. Sec.-Treas., H. Thompson, 215 Chambers of Commerce Building, Winnipeg. Architect, E. G. Sherwood, 3 Commonwealth Block, Winnipeg. Two storeys and basement, 42 x 76, stone foundation, brick construction. Tenders will be called.

CONTRACTS AWARDED

Chatham, Ont.

Remodelling theatre, cost $10,000, King street, for W. O'Brien, manager Walker Shirt & Pant Company, Market Building. Builder, Thos. McKie, Grey street. Seating capacity 1,000.

Goderich, Ont.

Alterations to hospital, cost $5,000. Chairman, Judge Holt, Court House. Architects, Langley & Howland, Continental Life Building, Toronto. Two storeys and basement, 50 x 54, stone foundation, stone and white brick construction. Plans prepared.

Hamilton, Ont.

Theatre, cost $50,000, for Dominion Theatres, Ltd., Mary street. Architects, L. H. Lemtert, Rochester, N.Y. General contractors, A. Bressett, 216 Park street north. Iron and steel, Hamilton Bridge Works, Ltd., Barton and Bay streets. 189 x 70, steel and brick construction.

Kingsville, Ont.

Library, cost $12,000. Town council. Clerk, Geo. Pearse. Architects, Crane & Pennington, Boug Building, Windsor. General contractors, Oxley Bros., Main street. Work to start in spring. One storey, 50 x 35, ornamental stone and pressed brick construction, stone and cement foundation.

Quebec, Que.

Extension to post office. Dom. Govt., Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Villeneuve, Bosse, Banks & Boivin, Quebec. Stone foundation and construction, structural steel.

Union, Ont.

Sanitorium, cost $4,000, for Daughters of the Empire. General contractor, D. H. McKay, Main street, Kingsville. Frame construction.

Business Buildings and Industrial Plants

Chatham, Ont.

Warehouse, cost $12,000, Queen street, for The American Pad & Textile Co. Architects, J. L. Wilson & Son, 64 Market Building, have prepared plans. Tenders will not be called until late in the spring.

Hamilton, Ont.

Hotel, cost $35,000, for Jos. Murphy, 12 Market square. Architects, [illegible] & Witton, 2 Hughson street south, have prepared plans. Five storeys, 100 x 55, stone and cement foundation, structural street and pressed brick construction, tile and pine floors, felt and gravel rofing.

Alterations to office building, cost $5,000, for Geo. H. Milne, 78 West avenue south, builder. Architect not yet chosen. One storey addition, brick. Plans will be prepared.

Montreal, Que.

Garage, 120 x 101, Crescent and St. Catherine streets, for The Stockwell Motor Co., corner Bishop and St. Catherine street. Plans will be prepared.

Montreal, Que., Maisonneuve.

Bank building, Pius X. and Ontario streets, contemplated by Bank of Hochelaga. Plans will be prepared and building erected in spring.

Montreal, Que., Point St. Charles.

Foundry contemplated for Canada Foundry Co., 81 St. Peter street, Montreal. Plans will be prepared.

Niagara Falls, Ont.

Equipment for studio contemplated by Dominion Art Institute. Address manager, A. C. Thornton, 66 Queen street, after Feb. 15th. Company will instal photo enlarging plant. Will require water power air compressor, valves, air brushes, etc.

St. George, Ont.

Store. J. P. Wood has purchased building on Main street, and will remodel and instal general store fittings.

St. John, N.B.

Bank building, Market Square, for Bank of British North America. Architect, G. Ernest Fairweather, 84 Germain street. General contractors, G. Mooney & Sons, 112 Queen street. Contract awarded for demolition and removal of old building. Tenders for new building to be let soon.

Sarnia, Ont.

Factory, cost $7,000, planned for Sarnia Bridge Co., 176 North street. Manager, Roy M. Norton. New equipment required. One storey, reinforced concrete, structural steel construction.

Toronto, Ont.

Store and residence, cost $3,000, Danforth avenue, for Frank Abbot, 1680 Danforth avenue. Architect, T. E. Muirhead, 525 Kingston road. Two storeys, 30 x 46, cement foundation, brick construction. Plans drawn.

Machine room, Elizabeth street, for Trustees Toronto General Hospital, College street. Architects, Darling & Pearson, 2 Leader Lane. Stone foundation, concrete, brick and structural steel construction, concrete floors, felt and gravel roofing. Plans drawn.

Garage, cost $3,000, Elizabeth street, for Trustees Toronto General Hospital, College street. Architects, Darling & Pearson, 2 Leader Lane. Brick foundation, brick construction, concrete floors, felt and gravel roofing. Plans drawn.

Four pair stores and residence, cost $17,600, Pape avenue, for Robt. M. [illegible] Two storeys, 23 ft. 4 ins. x 45 ft. brick [illegible] metal ceilings. Plans drawn.

[illegible] Ellis & Connery, 72 Queen street west. Two storeys, 30 x 50, cement foundation, brick construction, felt and gravel roofing. Plans drawn.

Vancouver, B.C.

Plant, [illegible] Block & Tool Co., 801 Powell street. Architect, T. H. Bamforth, 319 Pender street west. Tenders to include pile driving, erecting the shop building and constructing a trestle about 75 x 100. Whole plant will cover area of 100 x 250 feet, an electric driven travelling crane will be installed to operate on a runway of 175 feet.

Victoria, B.C.

Office building, cost $300,000, Fort and Douglas streets, for The German Canadian Trust Co., c/o Architects, Gelland & Riley, 423 Sayward Building. Eight storeys, fireproof construction. Tenders will be called shortly.

Winnipeg, Man.

Extension to hotel planned for C. P. Rly. Manager Hotel System, Hayter Reid. Appropriations have been recommended and will likely be passed for extensions to the Royal Alexandra Hotel. About 200 rooms to be added. Work to start in spring.

CONTRACTS AWARDED

Chatham, Ont.

Rebuilding boot and shoe store, cost $6,000, King street, for G. Cowan. Builders, S. Hadley Lumber Co., 47 Wellington street.

Stratford, Ont.

Factory, cost $15,000, Gore street, for Stratford Mill Building Co., c/o Wm. Preston, Centre street. Architect, J. S. Russell, 21 Downie street. Work done by day labor. Three storeys, 162 x 58, cement and brick foundation, white brick, structural steel and iron construction. Excavating started.

Remodelling bank building, cost $6,000, Market, for Bank of Toronto, Head Office, Toronto. Architect, J. S. Russell, 21 Downie street. General contractor, Wm. Bradshaw, Water street. 40 x 30, stone and brick foundation, Ohio stone, reinforced concrete, tile, brick, structural steel and iron construction, plate glass, bank and office fixtures, grill work, vaults.

Toronto, Ont.

Warehouse, cost $13,000, Dufferin street, for Toronto Hardware Co., Dufferin street. Builders, Jas. C. Claxton & Co., 250 Shaw street. Three storeys, 100 x 112, cement and brick foundation, brick construction. Plans drawn.

Factory, cost $100,000, King and Dufferin streets, for A. B. Ormsby & Co., Queen and George streets. Builders and general contractors, Wickett Bros., 35 Deer Park crescent. Two storeys, 247 x 260, cement and brick foundation, brick and structural steel construction.

Winnipeg, Man.

[illegible] yards, Ross avenue. Engineer, H. N. Ruttan, 223 James avenue. General contractors, J. J. Carruthers, 127 Edmonton street. Board of Control. Secretary, M. Peterson.

Residences

East London, Ont.

Three residences, cost $7,500, for Bert Weir, corner Adelaide street and Dufferin avenue. 1½-storeys, 28 x 35, cement foundation, white brick construction. Plans in progress.

Montreal, Que.

[illegible] for M. Thibault, 621 Casgrain street [illegible] brick, cement [illegible]. Plans have been prepared. [illegible] avenue. Three storeys, [illegible] x [illegible], brick, cement foundation, felt and gravel roofing. [illegible]

[illegible], cost $[illegible], for E. Mc[illegible] avenue. Architect W. E. Doran, 189 Bleury street, Montreal. Tenders received by Architect after Feb. 1st. Two storeys, pressed [illegible] and [illegible] construction, cement foundation.

Moose Jaw, Sask.

[illegible], cost $[illegible], Wellesley Park, for William Holmestead, Scott Building. Architect, Shotto Smith. 1½ storeys, 30 x 30, cement foundation, fraem construction. Plans in progress.

Toronto, Ont.

[illegible], cost $5,200, Rusholme Park, for J. H. McCombe, 911 Dovercourt road. Architect, T. T. Crouch, 911 Dovercourt road. 2½-sty., 36 x 42, brick construction, stone foundation. Plans drawn.

Two detached residences, cost $5,000, Pacific avenue, for Fuller Bros., 13 Har[illegible] storeys, 22 x 34, brick construction and foundation. Plans drawn.

Two detached residences, cost $4,600, Fairview Boulevard, for Skipper Bros., 52 Greenwood avenue. Architect, S. A. Skipper, 399 Curzon. 2½-storeys, 22 x 40 each, brick, brick and cement foundation. Plans drawn.

Pair residences, cost $5,000, Rainsford, for Ed. Elliott, 77 Vermont. 2½-stys., 35 x 42, cement foundation, brick construction. Plans drawn.

Apartment, cost $80,000, Bloor and Crawford, for W. S. Brady, 413 Palmerston. Architect, J. H. MacKenzie, 203 Lumsden Building. Four storey, 75 x 125, brick, structural steel and stone construction, brick and stone foundation. Plans drawn.

Two detached residences, cost $4,700, Runnymede, for M. Jacobs, 34 Vernon. Two storeys, 23 x 42, brick construction and foundation. Plans drawn.

Residence, cost $5,000, east side Broadview. Architect and builder, Chas. V. Mitchell, 1306 Yonge street. Two storey, brick construction, stone foundation. Plans drawn.

Vernon, B.C.

Residence, for Mrs. Poole. Architects, Doctor, Stewart & Davie, 578 Seymour street. Two storeys and basement, rustic construction. Plans in pro-[illegible]

Verdun, Que.

Four residences, cost $3,200 (each), First avenue, for W. A. Robertson, 33 First avenue. Two storeys, 25 x 39, brick, cement foundation, felt and gravel roofing. Plans prepared.

Residences, cost $8,500, Desormeau, for J. Charbonneau, 42 Lasalle avenue. Three storeys, 55 x 37, brick, cement foundation, felt and gravel roofing. Plans prepared.

Vancouver, B.C.

Apartment building cost $75,000, for Louis R. Lurie, 333 Homer street. Architects, Jones & Beatson, Hutchinson Building. Four storeys, concrete construction. Tenders will not be called until March

Rooming house, cost $40,000, 816 Granville street, for R. A. Allen. Architects, Braunton & Liebert, 142 Hastings street west. Four storeys, brick construction. Plans prepared.

Windsor, Ont.

Four residences, cost $10,000, Giles street, for Jas. Herendeen, Herendeen's Hotel. Architects not yet chosen. 1½-storeys, 28 x 40, stone and cement foundation, white brick construction. Plans will be prepared.

Wingham, Ont.

Residence, cost $4,500, for J. F. Groves, Town Clerk. Two storeys, 25 x 38, white and red brick, stone foundation. Plans will be prepared.

Winnipeg, Man.

Residence, cost $3,500, Pine street, for D. S. Miller, 796 Strathcona. 25 x 40, stone foundation, frame construction. Plans in progress.

CONTRACTS AWARDED

Belmont, Ont.

Residence, cost $3,300. Architect and builder, Alva Jones, Belmont. 1½-stys., 30 x 35, cement foundation, cement block construction.

Residence, cost $3,200. Architect and builder, Jno. Stewart. 1½-stys., 25 x 35, white brick construction, stone and cement foundation.

Constance, Ont.

Residence, cost $4,500. Owner and builder, Wm. Cook. 1½-storeys, white brick construction, stone and cement foundation.

Exeter, Ont.

Residence, cost $3,800, Andrew street. Owner and builder, J. Welsh. 1½-stys., 28 x 35, white brick construction, cement foundation.

Residence, cost $4,200, Andrew street. Owner and builder, T. Kestle. 1½-stys., 35 x 45, white and pressed brick construction, stone foundation.

Gananoque, Ont.

Residence, cost $4,500, for W. T. Sampson. Architect, A. Stuart Allaster, Brockville. 2½-storeys, 30 x 36.

Hamilton, Ont.

Six residences, cost $14,400, Fairleigh avenue. Owner and builders, Seymour & McKay, 10 Augusta street. 2½-stys., brick construction, cement foundation.

Montreal, Que.

Residence, cost $6,000, Jacques Hertel. Owner and Builder, Raoul Aubertin, 44 Monk Boulevard. Two-storeys, 50 x 50, cement foundation, brick construction, felt and gravel roofing. Excavation started.

Residence, cost $3,500, for Samuel Duncan, 85 Clananauld street. Architects and general contractors, International Construction Company, 747, St. Catherine. Two storeys, 20 x 55, brick construction, cement foundation, felt and gravel roofing.

Residence. Owner and builder, David Lazauik, 935 Marquette. One storey, 25 x 37, brick, stone foundation, felt and gravel roofing.

Residence, cost $7,000, for Miss Victorine Morin, care Architects, Wadsworth & Henderson, New Birks Building, Montreal. General contractors, Adam Orr & Company, 745 St. Catherine street, Montreal. Two storeys, 32 x 35, cement foundation, frame and rough cast construction.

Residences, cost $6,500, Third avenue. Owner and builder, Wilfred Laurin, 174 Third avenue, Emard. Three storey, 72 x 30, brick, cement foundation, felt and gravel roofing. Excavation started.

Residence, cost $4,000. Owner and builder, Chas. Gairard, 628 Casgrain avenue. Three storeys, 25 x 45, cement foundation, solid brick construction, felt and gravel roofing. Foundations in.

Residences, cost $6,000, Decelles avenue, for J. A. Bonneville, 251 Decelles avenue. Architect, G. A. Monette, 97 St. James. General contractor, L. H. Perham, 1 Bellingham avenue. 2-stys., 35 x 51, pressed brick construction, cement foundation, felt and gravel roofing.

Niagara Falls, Ont.

Residence, cost $6,500, River road, for J. H. Stuart, manager Bank of Hamilton. Builder, W. P. Blair. Two-storeys, 50 x 40.

North Ekfrid, Ont.

Residence, cost $4,000. Owner and builder, Thos. Hardy. Two storeys, 30 x 38, white brick, stone and cement foundation.

Ottawa, Ont.

Residence, cost $6,000, 1st avenue. Owner and builder, J. W. Nimmo, 288 1st avenue. 25 x 37, stone foundation, brick veneer construction.

Residence, cost $6,500. Owner and general contractor, Thos. Clarey, 111 Centre street. Two storeys, 44 x 35, double brick veneer construction, stone foundation.

Residence, cost $5,500. Architect and general contractor, J. W. Nimmo, 288 1st avenue. 25 x 37, brick veneer construction. Foundations in.

Residences, cost $20,000, Monk, for Ed. Cluff. Architect and general contractor, R. A. Kemp, 149 1st avenue. One residence foundations in, one residence ready for plastering. 40 x 42, brick veneer construction.

Residences, cost $4,000, for M. J. Rock, 428 Gilmour. Builder, Wm. Benson, 253 Florence. 21 x 38, stone foundation, brick veneer construction.

Residence, cost $7,000, Carling. Owner and builder, J. W. Nimmo, 288 1st avenue. 26 x 40, stone foundation, brick veneer construction.

Residences, cost $5,600, Powell. Owner and builder, S. W. Halliday, 20 Arlington avenue. 30 x 37, brick veneer construction, stone foundation, felt and gravel roofing.

Quebec, Que.

Residence. Owner and general contractor, L. P. Cote, 88 Artillery street. 2½-storeys, 45 x 30, brick construction, felt and gravel roofing. Foundations in.

Toronto, Ont.

Residence, cost $3,500, Oakwood ave. Owner and builder, W. T. Moad, 86 Vaughan road. 2½-storeys, 24 x 32, brick construction, stone foundation.

Six pair residences, cost $23,000, south side Beaver avenue, for Deeth & Sons, Ltd., 44 Grove avenue. Work being done by day labor. Brick construction, stone foundation, shingle, felt and gravel roofing. Excavating started.

Residence, cost $3,000, Jackman. Owner and builder, W. H. Howard, 19 Englewood. 2½-storeys, 22 x 32, brick construction and foundation.

Two residences, cost $5,500, Temple. Owner and builder, W. B. Charlton, 140 Close avenue. 2½-storeys, 45 x 43, brick, cement foundation.

Residence, cost $3,000, Temple avenue. Owner and builder, J. F. Alexander, 26 Roxton road. 2½-storeys, stone foundation, brick construction.

Wingham, Ont.

Two apartment houses, cost $6,000. Architect and Builder, John A. McLean, contractor, Wingham. Three storeys, 35 x 50, cement foundation, white brick construction.

Winnipeg, Man.

Residence, cost $3,500. Owner and builder, Warburton Cons. Co., Ashburn street. Two storeys, 30 x 35, stone foundation, frame construction.

Residence, cost $3,500, 2 Pine street. Owner and builder, D. S. Miller 796 Strathcona. 2½-storeys, 25 x 40, stone foundation, frame construction.

Residence, cost $4,000, Dominion. Owner and builder, J. F. Parker 194 Young street. Two storeys, 30 x 30, stone foundation, frame construction.

Residence, cost $5,000, Strathcona. Owner and builder, J. F. Parker, 194 Young street. Two storeys, 40 x 30, stone foundation, frame construction.

Power Plants, Electricity and Telephones

Fort Frances, Ont.

Telephone system planned by town council. Time extended for receiving tenders from Feb. 1st to March 1st. Plans and specifications at office of Clerk, J. W. Walker.

Listowel, Ont.

Town council contemplate purchasing equipment for electric lighting extensions. Mayor, Wm. Climie.

Montreal, Que.

Bell Telephone Co., Notre Dame west and St. John streets, Montreal, has made application to town council to instal underground wire in conduits on 20 streets.

Enclose plant, cost $5,000, to protect plant from coke screenings, planned for Montreal Light, Heat & Power Co., Power Building, Craig street. 32 x 32, brick solid, 12 ft. walls, concrete foundation.

Regina, Sask.

Line materials, insulators, toppins, guy wire, copper sleeves, cross arms, for Prov. Govt. Dept. of Railways and Telephones. Specifications at Department. Tenders received by Deputy Minister, D. C. McNab, until February 8th.

Saskatoon, Sask.

Extension to electric lighting and power system planned by city council. Clerk, Andrew Leslie. By-law to be submitted on Feb. 11th to raise [illegible]

Toronto, Ont.

Equipment for transmission line for Hydro-Electric Power Commission, Bay and Richmond streets, C. O. Salter, Chairman, Hon. Adam Beck, 169 Albert street, London, Ont. Tenders received by owners until March 17th for galvanized steel towers, special crossing towers, copper cable, aluminum cable, insulators, galvanized malleable iron clamps, galvanized pressed steel clamps.

Walkerton, Ont.

Extension electric lighting system, cost $5,000, planned by town counicl. Clerk, J. H. Scott. General contractor, Walkerton Electric Light & Power Co., Durham street.

Miscellaneous

Calgary, Alta.

Supply of 85,000 barrels of cement required by city commissioners. Specifications at their office. Tenders received by Clerk, J. M. Millar, until February 12th, 1913.

Kingston, Ont.

Supplies required by city council (civic utilities committee) for the gas electric and waterworks plants for 1913. Application forms may be obtained from general manager. Tenders received by general manager, C. C. Folger, Queen street.

London, Ont.

Motor fire truck, cost $7,500, required by city council (committee No. 3). Tenders received by Clerk, Samuel Baker, until Feb. 26th. Specifications at office of Clerk, City Hall. Fire truck, comb. hose 1,200 feet 2½ inches, 80 h.p. motor driven chemical engine, 140-gal. tank. To be delivered May 31st, 1913.

Ottawa, Ont.

Supply of refined asphalt, sand, brass work and lumber, required by city council. Acting city engineer, F. C. Askwith. Tenders to be called shortly. Specifications at office of City Engineer, City Hall, and MacLean Daily Reports, Toronto.

Business Notes

Deseronto, Ont.

Drug store burned. Owner, W. J. Malley, Main street. The Bell Telephone Co., and The Canadian Express Co occupied offices in building. Cables, wires and furniture were destroyed.

Fort Saskatchewan, Alta.

Hotel, business block, etc., on Ross street. Owners, K. & A. McDonald, proprietors Queens Hotel. Loss $15,000 to building, $5,000 contents. Jones, Graham & O'Brien, general store. Loss $70,000, to building and contents. A. M. Sutherland drug store, loss $10,000, building and contents. A. M. Carscadden, hardware store, loss $15,000, building and contents. H. Wright, loss $10,000, building and contents. G. B. Taylor, loss $5,000, building and contents.

Galt, Ont.

Business block, [illegible] street, burned. Owner, A. C. Fraser, c/o Fraser Hardware Co. Loss to building and stock, $60,000. Insurance, $15,000. W. Peard, Mfr. Sweaters, in same building, loss, $8,000, insurance, $5,000.

Lake Edward, Que.

Station of The Quebec & Lake St John Ry., Quebec, Que., burned, loss, $1,000. General superintendent, F. M Spaidal. Insured. Will rebuild at once.

Montreal, Que., Westmount.

Residences burned. Owners, Miss Mary Pearson, 868 Victoria avenue, loss $7,500; Misses Tait, 864 Victoria avenue, loss $7,500; Mr. Tighe, 870 Victoria avenue, loss $7,000.

Montreal, Que.

Boarding school, burned, loss $4,000. Owner, Sir Wm. Van Horne, 513 Sherbrooke west. Building occupied by Misses Edgar & Cramp, to be rebuilt at once.

Factory of The Bass Fur Co., St. Peter and St. Paul streets, burned. Loss $50,000. To be rebuilt at once.

Portage la Prairie, Man.

Hudson's Bay Co.'s store burned. Loss $95,000. Work of rebuilding will be commenced immediately.

Quebec, Que.

Stores and residence, St. John street, burned. Owners, P. J. Cote, 40 d'Aiguillon, loss $25,000. Jos. Savard, grocer, loss partly covered by insurance. Will rebuild, stone and brick construction.

Trenton, Ont.

Stores and bank, Dundas street, burned. Owners, Sutcliff & Sons, dry goods. B. S. Hooey, grocery and liquor store. Banks of Montreal. J. J. Haines, shoe store.

Valleyfield, Que.

[illegible] station owned by New York Central Railway, burned. Insured, will rebuild.

Winnipeg, Man.

Store building at 818 Main street, burned, loss $6,000. The first floor was occupied by Harrison Bros., druggists.

New Companies

Ardagh, Limited, has been incorporated with a capital of $40,000 to carry on the general business of a land and building company with head office at Toronto. The provisional dorectors are I. J. Ardagh, H. R. Douglas, estate brokers, and R. D. Hume, barrister, all of Toronto.

Pratt Realty Company, Limited, has been incorporated with a capital of $150,000 to carry on business as a general land and building company, with head office at Toronto. The provisional directors are N. D. Maclean, barrister, A. F. Schultz, assistant general manager, and J. T. Campbell, accountant, all of Toronto.

The McCracken Corporation, Limited, has been incorporated with a capital of $150,000 to erect buildings and deal in brick, tile and other building materials, with head office at Windsor. The provisional directors are H. D. McCracken, of Windsor, real estate dealer, C. W. Powell and Cameron McCracken, real estate dealers, of Detroit, Mich.

Standard Bronze Company, Limited, has been incorporated with a capital of $40,000 to carry on business as general contractors, merchants and manufacturers, with head office at Toronto. The provisional directors are C. S. McDonald, C. H. Willson, merchants of Toronto, and F. J. Parsons, of Montreal.

The Western Woodworking Company, Limited, has been incorporated with a capital of $10,000 to manufacture

(Continued on page [illegible])

Tenders and For Sale Department

Plans Wanted

Architects are requested to submit, free of [illegible] before [illegible] 1913 [illegible] with [illegible] two-storey 10 [illegible] school building with assembly room to be erected in the Town of Brampton in the County [illegible]

[illegible] 1913

T. J. BLAIN,
4-6 Sec.-Treas. Brampton Public School Board.

CITY OF REGINA, SASK.

Regina Municipal Railway

TENDERS

For Track, Paving, Intersections and Specials

Sealed tenders, registered, and clearly marked on the outside of the envelope "Tenders for Street Railway Pavement Track Intersections and special Work," and addressed to the City Commissioners, Regina, Sask., Canada, will be received up to noon, **Monday, the 10th day of March, 1913**, for the supply of:—

Contract K.

40,000 sq. yds. track paving with top finish and sub-base.

Contract L.

Eleven single track, three part Wyes, 60 lb. A. S. C. E. section.

Eight single track, plain curves, 60 lb. A. S. C. E. section.

Four Turnouts, guarded rail, 60 lb. A. S. C. E. section.

Various cross-overs, Diamond Turnouts and special intersections.

All track intersections and specials to be delivered F.O.B. Regina, freight and duty paid.

Copies of specifications, schedules delivery dates, and blue prints with full particulars, and form of contract can be had upon application to H. Doughty, Superintendent, The Regina Municipal Railway, Regina, Sask., Canada.

Persons tendering are notified that tenders will not be considered unless made on form provided. Forms will be mailed upon request to the Superintendent.

A marked cheque covering five per cent. (5 p.c.) of the amount of the bid (made payable to the City Treasurer) must accompany each [illegible]

The City Commissioners reserve the right to reject any or all Tenders.

R. MARTIN, Mayor.
G. A. MANTLE,
L. A. THORNTON,
City Commissioners.
5-7

City of Calgary

Tenders for Cement

Sealed tenders addressed to the undersigned will be received by the City Commissioners up to noon of **Wednesday, February 12th, 1913**, for the supply of 85,000 barrels, more or less, of cement, delivery to be made in approximately six monthly deliveries. First delivery March 1st, 1913.

For full particulars apply to the City Commissioners, City Hall, Calgary, Alberta.

J. M. MILLER, City Clerk.

January 24th, 1913,
Calgary, Alberta.
6

County of Lanark

Tenders for Steel Bridge

Sealed tenders, endorsed "Tender for Steel Bridge," will be received by Geo. Kerr, Esq., Chairman of Roads and Bridges Committee, Fall Brook, Ont., up to 12 o'clock noon **February 15th, 1913**, for the construction and erection of a steel Highway Bridge over the River Mississippi at Innisville, in the Township of Drummond, Lanark County, Ont.

Drawings, general conditions and specifications may be seen at the office of the County Clerk, Perth, Ont., or at the office of the Engineer, Carleton Place, Ont.

B. G. MICHEL, C.E.,
Acting Engineer.
6

Sealed tenders addressed to the undersigned, and endorsed "Tender for Public Building, Aylmer, Ontario," will be received at this office until 4.00 p.m. on **Monday, February 17, 1913**, for the construction of a Public Building at the place mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the Post Office, London, Ont., at the Post Office, Aylmer, Ont., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, January 25, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—34802. 5-6

City of St. Boniface

TENDERS FOR

Substructure of Bridge

Sealed tenders will be received by the undersigned up to **Monday, the 17th day of February, 1913**, at 5 o'clock, for the supply of material and erection of the substructure of the Provencher Bridge, across the Red River, at St. Boniface.

Plans, specifications and forms of tender may be had at the City Engineer's office, St. Boniface, Man., on and after Monday, February 3rd, 1913.

A marked cheque for $10,000 must accompany each tender.

Tenders must be marked on the outside of the envelope "Provencher Bridge Substructure."

Lowest or any tender not necessarily accepted.

(Signed) J. B. Cote,
City Clerk.
6-7

County of Lanark

TENDERS FOR

INNISVILLE BRIDGE

Sealed tenders, addressed to Geo. Kerr, Esq., Chairman of Roads and Bridges Committee, Fall Brook, Ont., and endorsed "Tender for Innisville Bridge," will be received by the Lanark County Council, up to 12 o'clock noon, **February 15th, 1913**, for the construction of five concrete piers and two abutments, for the projected steel Highway Bridge over the River Mississippi at Innisville, in the Township of Drummond, Lanark County, Ont.

Drawings, general conditions and specifications may be seen at the office of the County Clerk, Perth, Ont., or at the office of the Engineer, Carleton Place, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signature, stating their occupations and places of residence.

B. G. MICHEL, C.E.,
Acting Engineer.
6

TENDERS FOR

RETAINING WALL

Coxwell Avenue Subway

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, February 18th, 1913**, for Reinforced Concrete Retaining Wall at Coxwell Avenue Subway.

Specification and tender form may be obtained upon application at the office of the Railways, Bridges & Docks Section, Department of Works, City Hall, Toronto.

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as prescribed by City By-law must be strictly complied with or the tenders may be declared informal.

Tenderers shall submit with their tenders the names of two personal sureties approved by the City Treasurer, or in lieu thereof, the bond of a guarantee company approved as aforesaid.

The lowest or any tender not necessarily accepted.

H. C. HOCKEN, Mayor,
Chairman, Board of Control.

City Hall, Toronto,
January 29th, 1913.
6

Messrs. Royce Limited, Electrical & Mechanical Engineers, Trafford Park, Manchester, Eng., wish to communicate with a firm of Constructional Engineers in Canada who wrote them during 1912 offering their services as Agents, and will be obliged if the firm in question will respond to this advertisement. 6 8

Tenders Wanted

Sealed tenders registered and endorsed on the envelope. Tender for (Tender bidding on) and addressed to Sydney Appleby, Esq., Secretary-Treasurer of the Town of Sutherland, Sask., will be received up to 6 p.m. **February 24th, 1913,** for the supply and delivery of the following materials and the performance of certain works:—

Tender "A"
For the supply and delivery of approximately 8,650 feet of 12-inch steel pipe and specials.

Tender "B"
For the supply and delivery of approximately 9,775 feet of 10-in. steel pipe or cast iron pipe.
Approximately 4,000 feet of 8-in. steel pipe or cast iron pipe.
Approximately 18,800 feet of 6 in. steel pipe or cast iron pipe and specials.

Tender "C"
For the supply and erection of Stand pipe.

Tender "D"
For the erection of sewage disposal works.

Tender "E"
Trenching and laying 8,650 feet of steel water pipe for supply main, setting valves, etc., and back filling.

Tender "F"
Trenching and laying of approximately 9,775 feet of 10-in. steel pipe or cast iron pipe.
4,000 ft. of 8-in. steel pipe or cast iron pipe.
18,800 ft. of 6 in. steel pipe or cast iron pipe.
Setting valves, hydrants, etc., and back filling.

Tender "G"
Supply and delivery of—
3,420 ft. of 20 in. vitrified sewer pipe.
8,030 ft. of 18-in. vitrified sewer pipe.
2,200 ft. of 15-in. vitrified sewer pipe.
Excavating and laying and construction of manholes, etc.

Tender "H"
The supply and delivery of—
3,766 ft. of 12-in. vitrified sewer pipe.
5,650 ft. of 10-in. vitrified sewer pipe.
5,080 ft. of 8-in. vitrified sewer pipe.
Excavating and laying and construction of manholes, etc.

Tender "I"
For the construction of approximately 62,000 square feet of concrete sidewalks.
1,670 lineal feet of curb.

Tender "J"
[illegible] grading.

Tender "K"
[illegible] lief Valve.

[illegible]

The lowest or any tender not necessarily accepted.

For the supplying of materials and all trenching the tender forms must be filled in, these are obtainable at the Consulting Engineers' offices.

[illegible] offices of the Consulting Engineers, Saskatoon, Sask.

[illegible] and Montreal.

Or a complete set of plans and specifications [illegible] all the contracts on a deposit of One hundred [illegible]

[illegible] closing tenders.

[illegible]

[illegible]

6 8 [illegible]

Board of Education

Tenders Wanted

New Central Technical School

The Advistory Industrial Committee of the Board of Education will receive sealed tenders, addressed to the Secretary-Treasurer of the Board on or before

Monday Noon, Feb. 10th, 1913,

for Electric Wiring required for

NEW SCHOOL BUILDING

Fronting on Lippincott Street, Toronto

[illegible] at the office of the Canadian Domestic Engineering Company, Limited, 47-51 King Street West.

Each tender must be accompanied with a certified bank cheque for five per cent. of the amount of tender, or its equivalent in cash.

Tenders must be in the hands of the Secretary-Treasurer at his office in the City Hall, not later than 12 o'clock noon on the day named, after which no tender will be received.

The lowest or any tender not necessarily be accepted.

[illegible]
Chairman of Advisory Industrial Committee.
W. C. WILKINSON,
6 Secretary-Treasurer.

Province of New Brunswick

Department of Public Works

Notice to Contractors

Sealed Tenders Marked

[illegible] ture and approaches of Newcastle Bridge will be received at the Department of Public Works, Fredericton, until **Wednesday 26th day of February, 1913,** at noon, for building the substructure and approaches of a new bridge on a new site at Newcastle, N.B., over the Miramichi River, between the Parishes of Newcastle and Glenelg, Northumberland Co., N.B., according to plans and specifications to be seen at the Public Works Department, Fredericton, N.B., at the office of Hon. John Morrissy, Chief Commissioner of Public Works, Newcastle, Northumberland County, [illegible] at the Provincial Government Rooms, St. John, N.B., and at the Chief Draughtsman's Office of the Public Works Department, City Hall, Montreal, P.Q.

[illegible] ment's standard tender forms, supplied for the purpose. They shall be signed with the tenderer's actual signature, stating occupation and place of residence. In the case of firms, the [illegible] and place of residence of each member of the [illegible]

[illegible] five per cent. of the tender, which will be forfeited if the party tendering declines to enter into contract when called upon. Such certified bank cheque or cash will be returned to the [illegible] shall be retained until the final completion of the [illegible]

[illegible]

[illegible]

[illegible] 6 8

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. **11-t.f.**

Notice to Contractors

Work Supplies

Sealed tenders addressed to the Chairman of the Board of Control, City Hall, Ottawa, will be received by the Secretary of the Board of Control, City Hall, Ottawa, up to 4 p.m., **Thursday, February 13th, 1913,** endorsed "Tenders for Broken Stone, Brick, Sand Stone, Setts, Cement, Plank, and Cedar, Sand, Vitrified Clay Pipe, Refined Asphalt, Castings, or Sweepers, Brooms, and Draughting Supplies, as the case may be.

Specifications, form of tender and full particulars may be obtained on application at the City Engineer's Office, City Hall, Ottawa.

Any tender received after the above stated time will be declared informal.

The Corporation does not bind itself to accept the lowest or any tender.

F. C. ASKWITH,
Acting City Engineer.
Ottawa, Ont., Feb. 1, 1913. 6

Tenders For Construction Equipment

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, March 4th, 1913,** for

Concrete Mixers,
Grading Machines,
Tar Kettles,
Road Rollers, three-wheel,
Road Roller, Tandem,
Scarifiers,
Stone Crushing Outfit Complete (Stationary)
Centrifugal Pumps, Portable, with Boilers Mounted,
Boilers Mounted,
Hoisting Engines and Boilers,
Derricks,
Clams,
Buckets,
Excavating Machine, complete.
[illegible]

Specification and tender form may be obtained upon application at the office of the Purchasing Section, Department of Works, City Hall, [illegible]

[illegible]

The usual conditions relating to tendering [illegible] complied with or the tenders may be declared informal.

[illegible] City Treasurer, or in lieu thereof, the bond of [illegible]

H. C. HOCKEN, Mayor.

City Hall, Toronto,
[illegible]

Notice to Contractors

Water Works Supplies

[illegible] 4 p.m., Thursday, February 13th, 1913, for [illegible]

W. H. STORRIE,
[illegible]

Ottawa, Ont., Feb. 1, 1913. 6

DALHOUSIE, N. B.

Electric Lighting System

NOTICE TO CONTRACTORS

[illegible]

Wednesday, March 5th, 1913,

[illegible]

(1) Steam Pump.
(2) [illegible]
Contract H.—Two Boilers.
Contract J.—Electric Light Engine.
(1) [illegible]
(2) Gas Engine and Gas Producers.
(3) Diesel Oil Engine.
(4) Crude Oil Engine.
Contract K.—Electrical Equipment and Distribution System.

Plans and specifications may be seen on and after February 10th at the office of the Chief Engineers, Mail Building, Toronto, or at Dal- [illegible]

No tender necessarily accepted.

W. S. MONTGOMERY, Esq., Mayor.
ALEX. J. Le BLANC, Esq., Town Clerk.
[illegible] 6

TOWN OF SARNIA
Province of Ontario

Tenders for Water Works

Sealed tenders registered, and clearly marked on the outside of the envelope "Tender A," "Tender B," etc., as the case may be, and addressed to the Town Clerk, Sarnia, Ont., will be received up to 8 p.m., **Tuesday, March 15th, 1913**, for the supply of material and the construction of:—

Contract A.—All labor necessary for laying the force main, and furnishing certain materials therefor.
Contract B.—Furnishing all materials for and constructing pumping station.
Contract C.—Furnishing all materials for and constructing Infiltration Basins Sluiceway.
Contract D.—Furnishing Cast Iron or Steel Water Pipes and Special Castings.
Contract E.—Furnishing Gate Valves, Flexible Joints, Expansion Joints, etc.
Contract F.—Furnishing material for and constructing timber wharf or dock.
Contract G.—Furnishing and erecting Pumping Machinery and accessories.
Contract H.—Furnishing and erecting Boilers and accessories.

Copies of plans, profiles, specifications, instructions to bidders, etc., may be seen at the office of H. A. McLean, Town Engineer, Sarnia, or at the office of Chipman & Power, Toronto, on and after February 1st, 1913.

Persons tendering are notified that tenders will not be considered unless made on forms supplied. Forms will be mailed upon request to the En- [illegible]

Dr. J. A. BELL, Mayor.
Dr. W. A. HENDERSON,
Chairman Fire and Water Committee.

Sarnia, Ont., Jan. 29, 1913. 6-9

McMyler Derricks For Sale

Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover [illegible], two (2) marine engines, boilers, fuel [illegible] with whirley aboard. Address

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

For Sale

Second-hand, one 10-in. x 16-in., 36-in. gauge, saddle tank, Porter locomotive, steam brakes. In good running order. At present stored at Montreal Locomotive Works, Montreal. Also, dipper stick for 70-ton shovel and 3-yard steam shovel bucket, both rebuilt. Fraser, Brace & Co., 1328 Broadway, New York City 4-6

Town Foreman Wanted

Applications will be received by the undersigned for the vacant position of Town Foreman of the Town of Galt, Ont., up to **Wednesday, the 12th day of February.** Salary $1,400 per annum.

Only those capable of managing successfully large gangs of men, and having a thorough knowledge of Macadam Road-making, Cement Concrete and Sewer Construction need apply.

Applications to have endorsed on the envelope "Applicant for Town Foreman."

JOSEPH McCARTNEY,
5-6 Town Clerk, Galt, Ont.

FOR SALE
SCREENING PLANT

One Rotary Screen, 30-in. x 7-in. Perforations 1-in. to 2½-in., with extra plates for various sizes.

One Rotary Screen, 32-in. x 6-in. Perforations 1-in. to 2-in., with extra plates for various sizes.

One Double Deck Whip Ball Shaker Screen, American Road Machine make and adapted for screening coarse sand and plaster sand.

This plant is practically new. One month in use. Capacity 35 to 40 tons per hour. O reason for selling, capacity not large enough. Excellent plant for party requiring output of 300 to 400 tons per day. Reply to National Sand & Material Company, Limited, Welland Ont. 4-6

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors and manufacturers read the "Contract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect.

No extra charge is made for filing plans at one or all four offices.

Contract Record and Engineering Review

Montreal—B34 Board of Trade.
Toronto—220 King Street West.
Winnipeg—Commercial Travellers' Bldg.
Vancouver—429 Pender Street.

Situations Wanted

Civil Engineer, 23, desires position as instrument man on railroad location, construction or maintenance. Four years practical experience in field; accustomed to rough country; will go anywhere. Alfred Holmead, 772 St. Nicholas Ave., New York. 5-6

Situations Vacant

WANTED—Experienced plumbing goods salesman to travel throughout Ontario, Manitoba Saskatchewan and Alberta, to represent large American manufacturing concern. Address Box 684, Contract Record, Toronto, Ont. 3-6

WANTED—By a Construction Company, a first-class superintendent. Must be accustomed to handling large buildings. A thoroughly technical and practical man required. Reply, giving experience, etc., to Box 689, Contract Record, Toronto, Ont. 4-6

Two architectural draughtsmen required by Montreal architect. State age, experience and salary required. Permanent position if suitable. Contract Record, Box K. 119 Board of Trade, Montreal. 4-6

New Companies

(Continued from page 73)

and deal in timber, lumber and all kinds of wood products, railroad contractors supplies, etc., with head office at Westport. The provisional directors are W. C. W. Whitcher, manufacturer, of Westport, W. R. McGee, manufacturer, and T. D. McGee, barrister, all of Ottawa.

The Chatham Development and Realty Company, Limited, has been incorporated with a capital of $150,000 to carry on business as a general land and building company, with head office at Toronto. The provisional directors are A. T. Byrd, draughtsman, Alex Hain, merchant, and A. A. Miller, solicitor, all of Toronto.

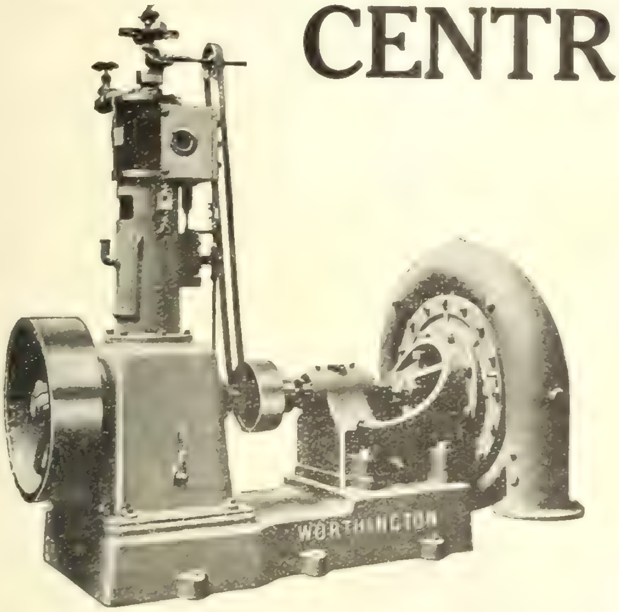
Equitable Securities of Canada, Ltd., have been incorporated with a capital of $1,000,000 to erect buildings and deal in all kinds of building material, with head office at Toronto. The provisional directors are H. A. Goldblatt, manager, W. V. Parker and T. R. Haig, barristers, all of Toronto.

Evel Casket Company, Limited, has been incorporated with a capital of $100,000 to acquire and develop timber limits, operate saw and planing mills, woodworking factories, etc., to manufacture and deal in caskets, coffins, undertakers supplies, etc., with office at Hamilton. The provisional directors are J. J. Evel, W. G. Evel and H. B. Evel, manufacturers, all of Hamilton.

Guardian Realty Company of Canada, Limited, has been incorporated with a capital of $2,000,000, to carry on business as a land and building company, with head office at Toronto. The provisional directors are G. W. Morley, law student; J. E. Riley, secretary, and W. H. Walter, accountant, all of Toronto.

St. Catharines Land Corporation has been incorporated with a capital of $375,000, to carry on business as a land and building company, with head office at Toronto. The provisional directors are Dr. W. H. Merritt, of St. Catharines, J. W. Baillie, broker, and J. D. McTaggart, accountant, of Toronto.

Ontario Granite Crushed Stone Company, Limited, has been incorporated, with a capital of $60,000, to carry on business as quarry masters, manufacturers and dealers in stone, brick, sand, gravel, etc., with head office at Gravenhurst. The provisional directors are M. J. Ryan, machinist, E. M. Fisk and A. C. Coulson, accountants, all of Toronto.



CENTRIFUGAL PUMPS

FOR

CONDENSER SERVICE

Centrifugal pumps are admirably suited for barometric condenser service, as they are capable of forcing a small supply of water to the total height of the condenser at the start and then, after the vacuum is formed, of giving the normal quantity all the while operating at a constant speed. The illustration above shows a volute centrifugal pump used for this purpose by the City of Winnipeg.

THE JOHN McDOUGALL
CALEDONIAN IRON WORKS CO., LIMITED

Works: Seigneurs & William Sts., MONTREAL Sales Offices; MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery, Pumps, centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants.

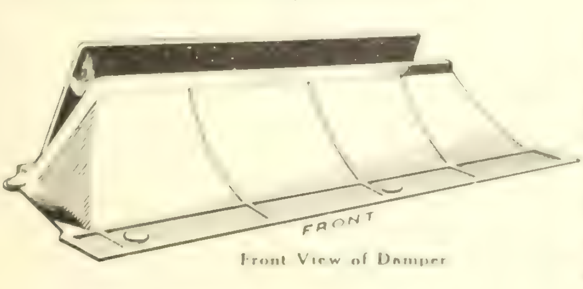
A New Fireplace Damper

The "Covert Improved" Throat and Damper

Patented in U. S. and Canada

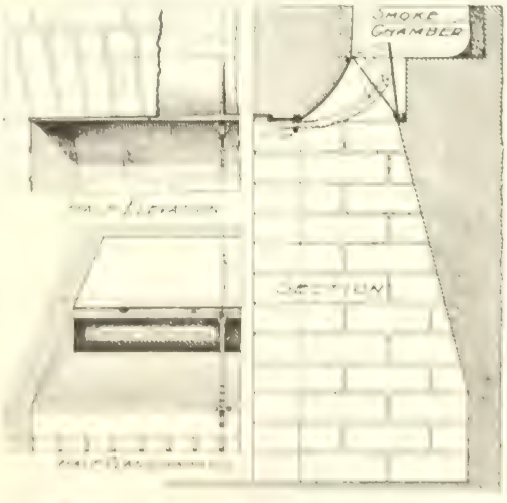
Architects who desire the latest word in successful fireplace construction are invited to send for 1913 edition of "Hints on Fireplace Construction."

Our combined Throat and Damper provides a strong lintel for the arch and brickwork above, smooth surfaces to lead the smoke and gases into the flue, and a front-operating valve giving perfect control of the draft—The latest and best Fireplace Damper.



Front View of Damper

Extensively use throughout the United States by foremost architects and builders



Showing Method of Installing Damper

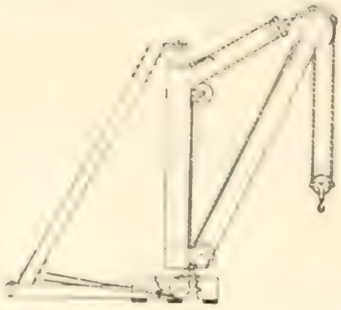
Send for printed matter to—

The Black Building Supply Co., Limited (SELLING AGENTS) Toronto, Canada

HOISTING ENGINES

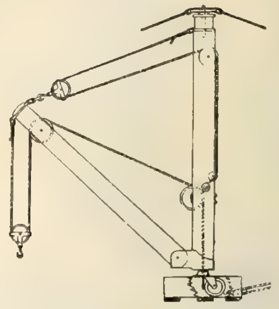
DERRICKS

Horse Powers
Winches or Crabs



Standard sizes and capacities of Derricks in stock for immediate shipment

Get our catalog and prices. They will interest you—All goods guaranteed.

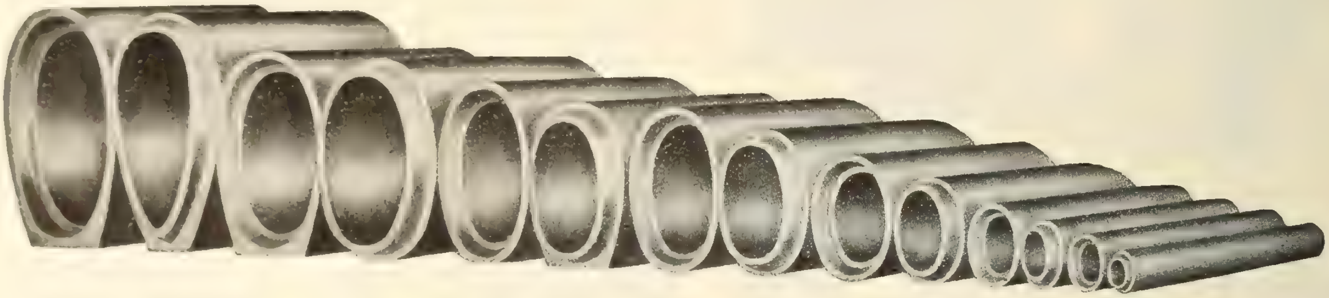


MARSH & HENTHORN

Limited

Makers of Hoisting Machinery **Belleville, Ont.**

Sales Agents : MUSSENS LIMITED, Montreal



Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario

EQUIP YOUR CELLAR

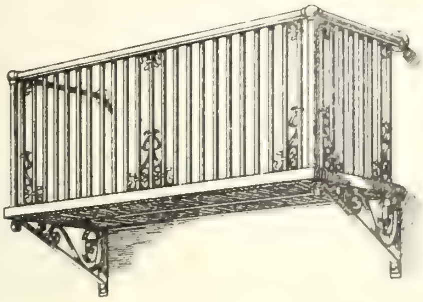
with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative : E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta



Wrought Iron Balconies

Porch Railings Stair Railings

Fire Escapes

Builders' Iron and Wire Work

Send for Catalogues

Dennis Wire & Iron Works Co.
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET

Hayes Patent
Metallic Lath

The positive key of the "Hayes" lath is unequalled in any other form of lathing. Examination of sample will prove this to you.

Specially suitable for tile work

SAMPLE BY MAIL ON REQUEST

The Metallic Roofing Co.
LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.
(40)

Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath.

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, *General Sales Agent*
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers

G. WOOLLISCROFT & SON, LTD.

Cables, "Blizzard, London," A.B.C. Code, 5th Edition

HANLEY, Stoke-on-Trent-England

Glazed and Floor Tiles of Every Description

Terra-Cotta, Quarries "Ironstone-Adamant"

Red Floor Tiles - Best and Cheapest on the Market

Carbonizing Coating Paint

The most durable and least expensive Paint made for preserving Iron or Steel in Bridges, Buildings, Structural Shapes, Gas Plants, etc.

Galvanum Paint

The only Paint that will adhere for years to Galvanized Iron roofing, siding, cornices, etc.

Concrewaltum Paint

The only Paint that will beautify and make walls, ceilings, tile, concrete, brick and stone walls moist-proof and sanitary. Produced with strong luster finish or semi-luster, or flat finish. Can be frequently washed without injury.

Manufactured in the United States and England by

The Goheen Manufacturing Co.

CANTON, OHIO., U.S.A., and Dock House, Billiter St., LONDON, E.C., ENG.

For sale by SANDERSON PEARCY & CO., LIMITED, Toronto, Ontario, Canada

Lap Welded Steel Pipe

MADE IN SIZES

12 to 72 inches Diameter

Used extensively for Water Supply for Mines, Mills, Hydraulic Operations and High Pressure Hydro Electric Installations.

Ask our Welded Pipe Dept. for prices.

American Spiral Pipe Works

MANUFACTURERS OF

SPIRAL RIVETED PIPE LAP WELDED PIPE

FORGED STEEL FLANGES

50 Church St. New York Box 485 Chicago, Ill.

$Dolarway Pavement

"It is permanent because it is concrete"

The Perfected Concrete Pavement

The appearance of Dolarway marked a new era in the construction of street pavements and highways. This is shown by the awarding of contracts for the construction of over a million and a quarter square yards during 1912 in the United States and Canada.

The Old Way

The old way was to build a concrete base four or five inches thick, then add a bituminous wearing surface two to three inches in thickness to the concrete base, which wearing surface cost approximately twice as much as the concrete base.

The old way was to have an expensive paving plant for construction and to pay from two to two and one-half dollars per square yard for all bituminous pavements built on a concrete base.

The Dolarway

The Dolarway method is to build a concrete pavement five or six inches thick, then seal and waterproof the surface with Dolarway Wearing Surface, which is from one-eighth to one-quarter of an inch thick and costs considerably less than the concrete base.

The Dolarway construction requires no paving plant, and a handsome permanent noiseless pavement is obtained at a saving of from 50c. to $1.00 per square yard over prices paid for bituminous pavements built on a concrete base.

Dolarway is the ideal material to pave between and adjoining street car tracks Dolarway meets all the requirements of a city pavement or a country highway where a permanent construction is desired. *Send for Booklet.*

DOLARWAY PAVING COMPANY

Whitehall Building, New York City

Dolarway Pavement, Jefferson, Ohio, U. S. A.

Canadian Supply Company

220 King Street, West, Toronto

Distributors for

HERCULES
WATERPROOFING
AND
STRENGTHENING
COMPOUNDS

WATERPROOFING ENGINEERS AND CONTRACTORS

¶ Estimates given on built up roofs of all kinds.

¶ We make a specialty of executing contracts for roofs in accordance with Barrett's specifications.

Dealers in

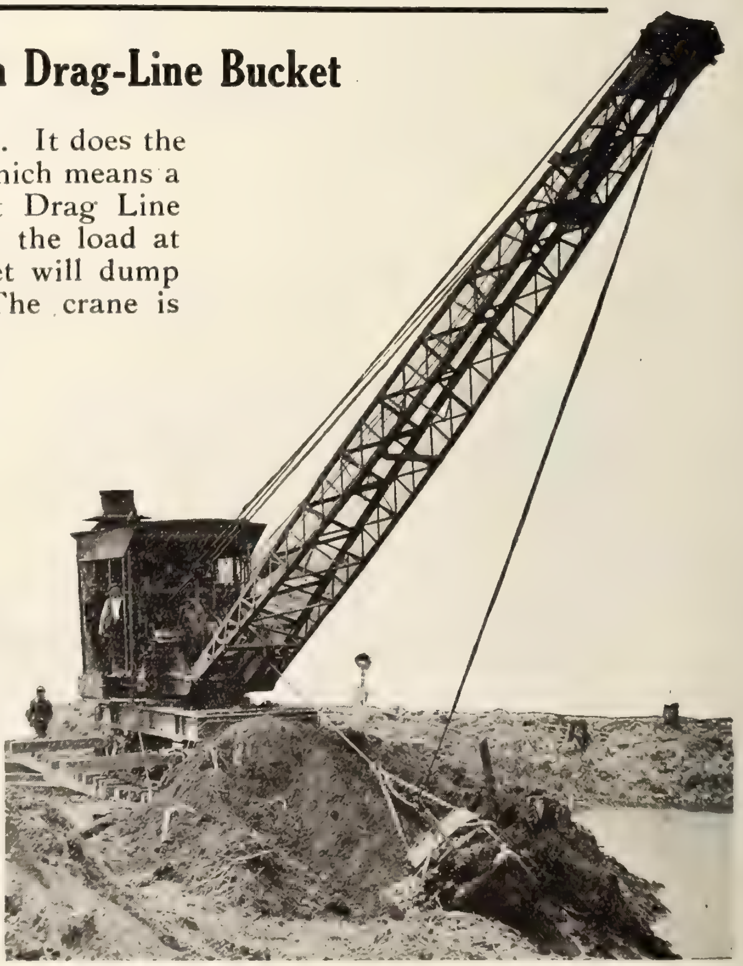
ASPHALT ROOFING
CASCO PAINTS
FELTS, PAPERS,
COAL TAR AND
ASPHALT
PRODUCTS

Let us tender on your Waterproofing and Roofing Specifications

---

Brownhoist Locomotive Crane With Drag-Line Bucket

is being used today on large excavating jobs. It does the work rapidly and with only a few men—which means a low cost per yard. With the Brownhoist Drag Line Bucket the operator of the crane can dump the load at any point along the boom—or the bucket will dump automatically at the end of the boom. The crane is shown here on the New York Barge Canal.



The Brownhoist Crane and Bucket are built for a severe service and continuous operation

Records show where the crane has been used day and night for months at a time without stopping for repairs. This appeals to contractors because loss of time is expensive.

We furnish this equipment up to 100 ft. booms and 3½ yd. bucket.

Write for detail information.

The Brown
Hoisting Machinery Co.
Cleveland, Ohio

New York
Chicago

Pittsburgh
San Francisco

The Hotchkiss Lock Steel Forms

For sidewalks, street cross-walks, curbs, curb and gutters, driveways, pavements and wall forms. Also fence post and reinforcements.

Special offers for export trade, introductory and demonstrative purposes only.

Write for illustrated folder.

Hotchkiss Lock Metal Form Co.
Dept. S **BINGHAMPTON, N.Y**

Engines and Boilers

of all types and sizes, Heaters, Tanks, Pumps, etc.

E. Leonard & Sons LONDON ONT.

AGENTS:
MONTREAL ST. JOHN, N. B. WINNIPEG CALGARY VANCOUVER

SELECTION OF LOCOMOTIVES

WHAT SHOULD BE KNOWN BEFORE YOU PURCHASE LOCOMOTIVES.

Nature of the service.
Capacity of the cars and weight of train.
Character of track—is it new or old.
Length of haul.
Is time an important factor.
Do you want a quick locomotive or a big puller.
Distance from base of supplies and quarters for the men.
Water and coal carrying capacity.

All these items and more should be considered. A careful study of conditions may mean larger profits.
Our experience may be valuable in considering them. A dollar saved is more than a dollar earned.
Write or wire us, or better still, come to see us.

MONTREAL LOCOMOTIVE WORKS, LIMITED

Rooms 702-704 Dominion Express Building, MONTREAL, Canada

Cumberland County Quarries

Red and Grey Freestone

Oakley Myers, Amherst, N.S.

Hardens with Age. Low Price. Samples and Quotations Free

Crushed Stone, Limited

STONE of any Size and in any Quantity on hand for Sidewalks, Roadwork or Concrete Work

Works :
Kirkfield, Ont.
Phone Main 4516

Head Office :
47 Yonge St. Arcade, TORONTO
G. W. ESSERY, Manager

Steel and Wood **TANKS**

Suitable for Sprinkler Systems Fire Protection, Water Supply Plants, etc.

Steel Substructures of all kinds
(Galvanized or Painted)

Windmills, Gasoline Engines, Hydraulic Rams, Etc.

Ontario Wind Engine & Pump Co.
Limited
TORONTO WINNIPEG CALGARY

C. P. R. Subway at Avenue Road, showing six weeks progress

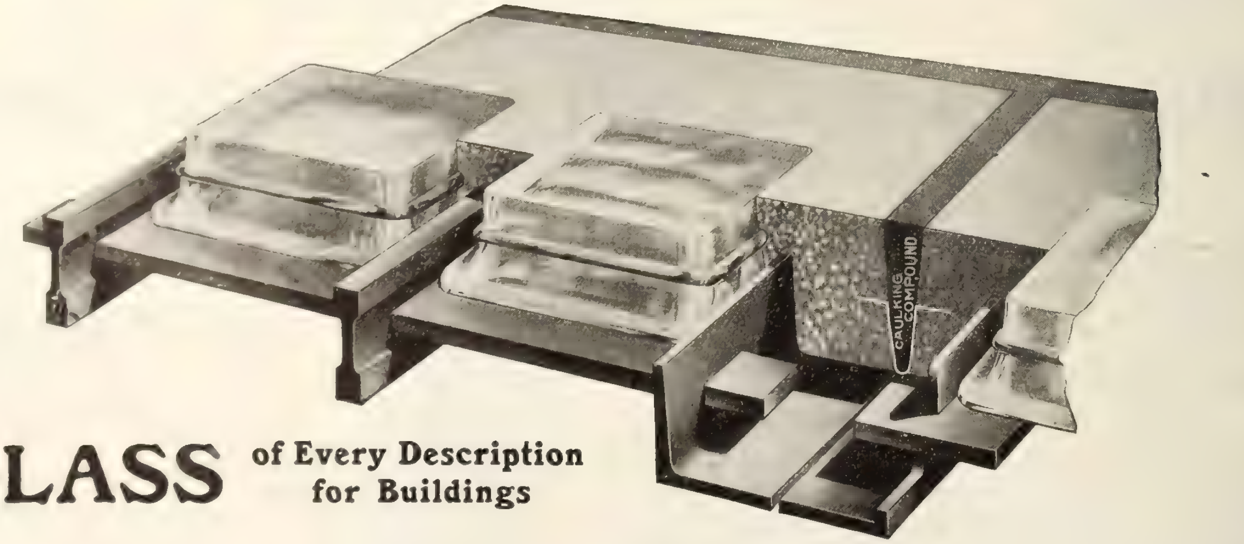
Jennings & Ross, Limited

ENGINEERS AND CONTRACTORS

Phone Ade. 292 Royal Bank Building, King and Spadina, TORONTO

3 Way Sidewalk Prisms

Special Catalogue dealing exclusively with Daylight Buildings sent on request



GLASS of Every Description for Buildings

HOBBS MANUFACTURING CO., LIMITED

LONDON TORONTO MONTREAL WINNIPEG

Current Prices of Building Material.

BRICKS

The following are wholesale prices delivered at Toronto:—

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock Lumber—

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving..	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

Shingles—

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

Cedar Posts—Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for box lots:—

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u i	$3 50	$5 00
26 40	3 75	5 50
41 50	4 25	6 25
51 60	4 75	7 00
61 70		8 00
71 80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock	net $1.85
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Square head brass cocks, 60 per cent.

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Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

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Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

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Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

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Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
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9-in.	65c ft.	20-in.	2.25 ft.
12-in. .. .	1.00 ft.	24-in.	3.25 ft.

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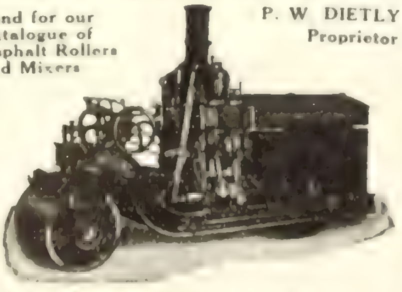

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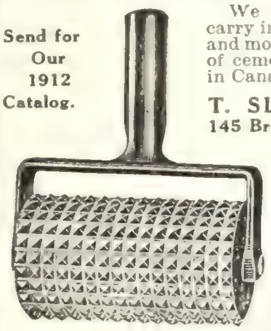

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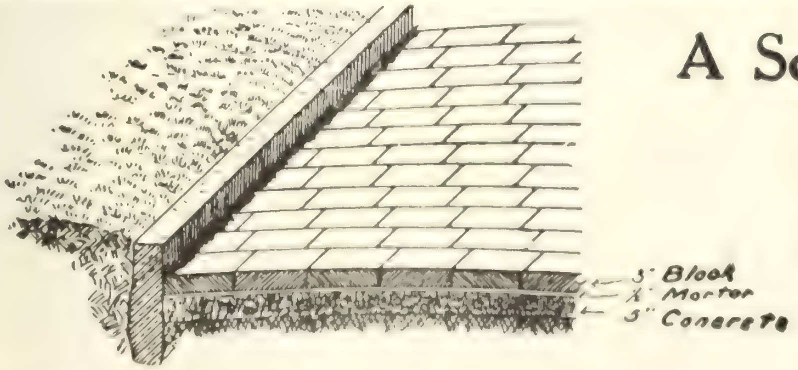

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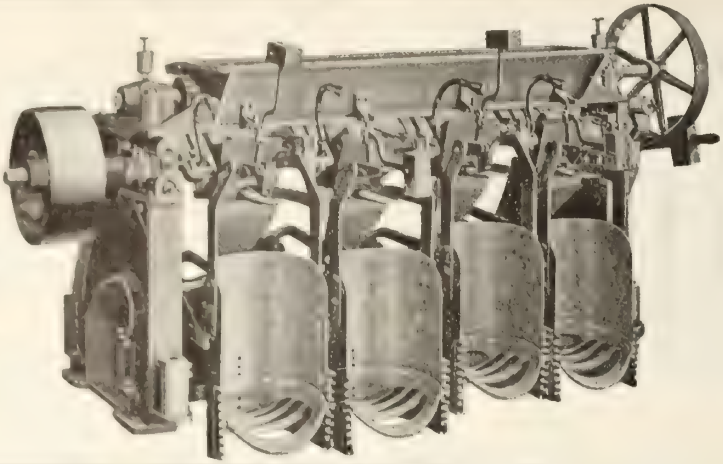

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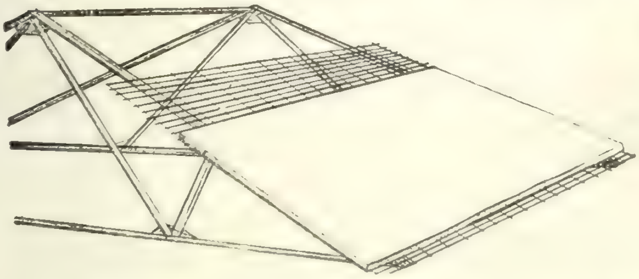

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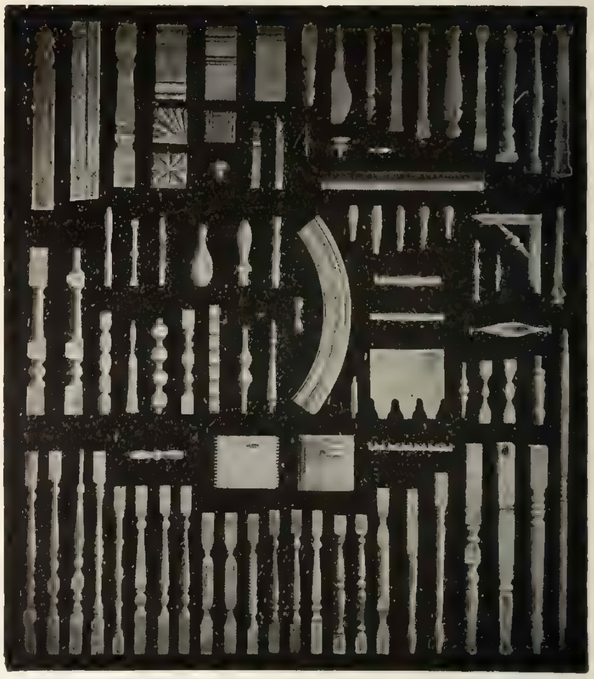

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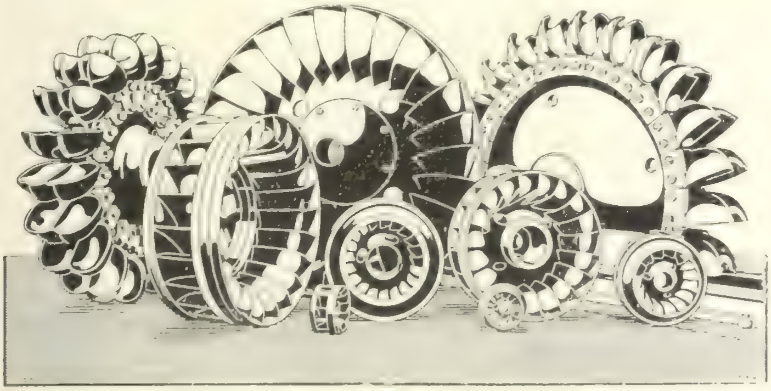

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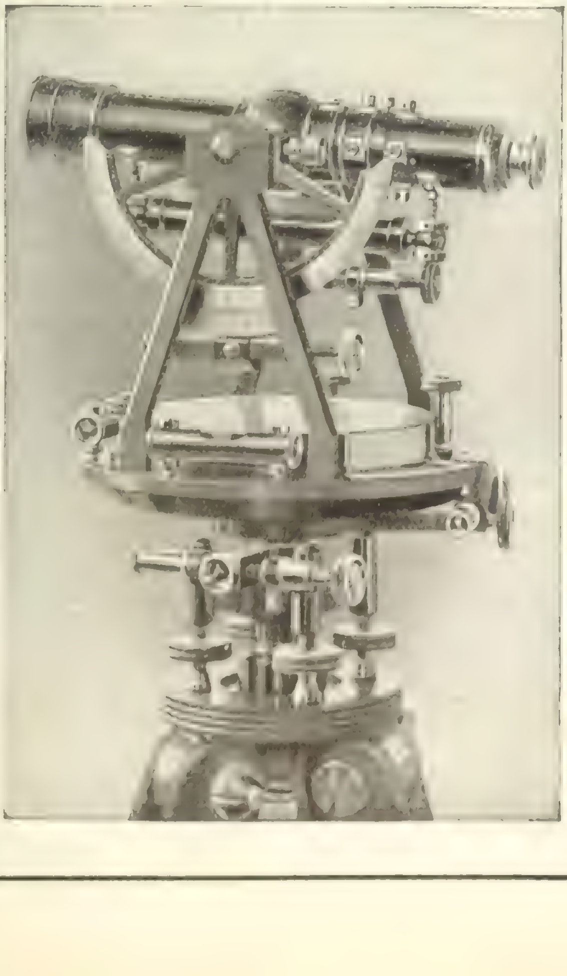

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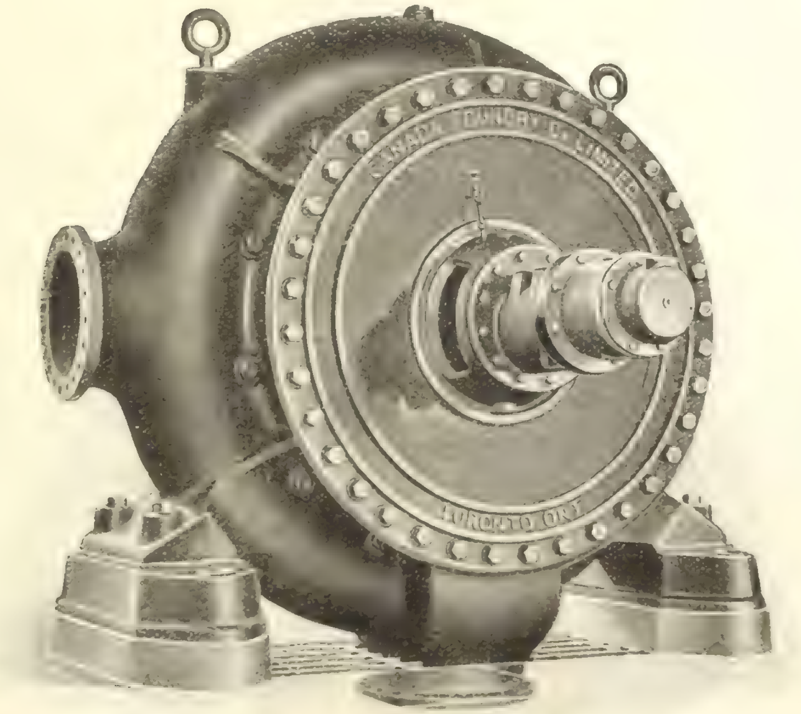

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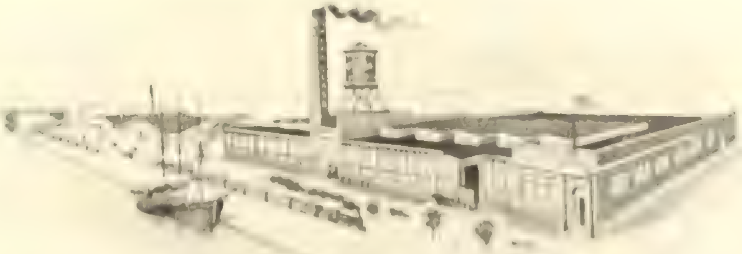

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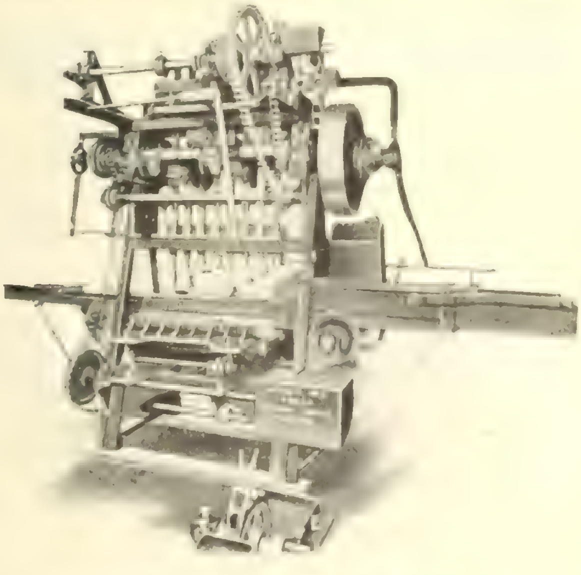

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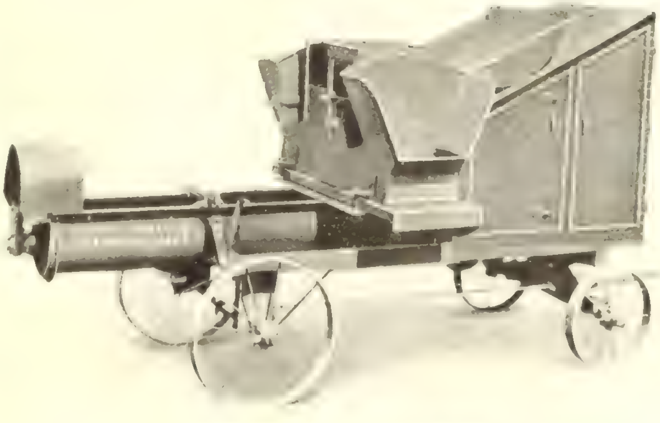

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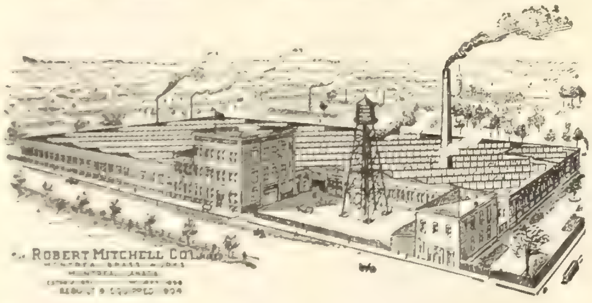
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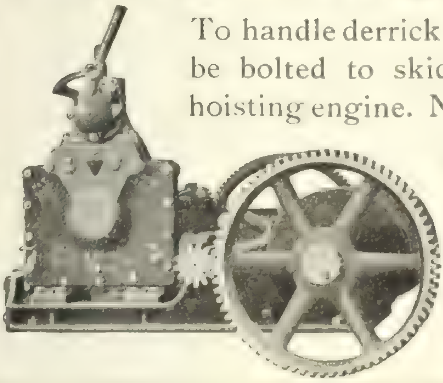

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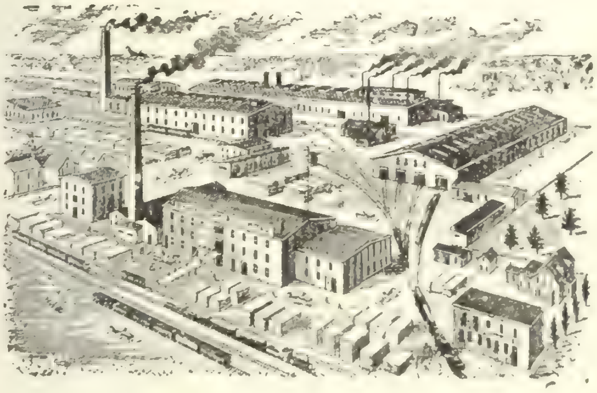

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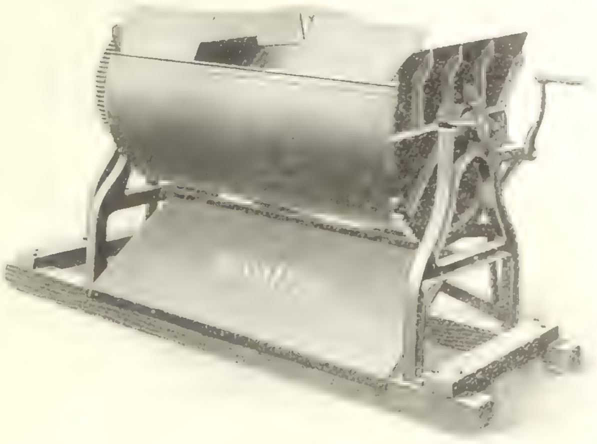

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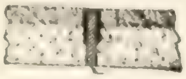

Cross Section of Pavement Showing Expansion Joint

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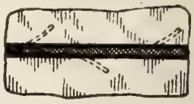

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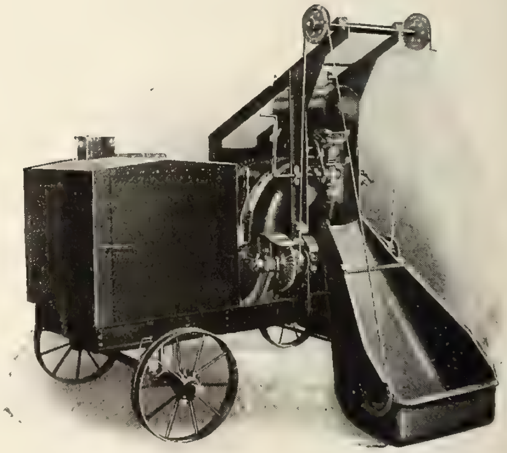

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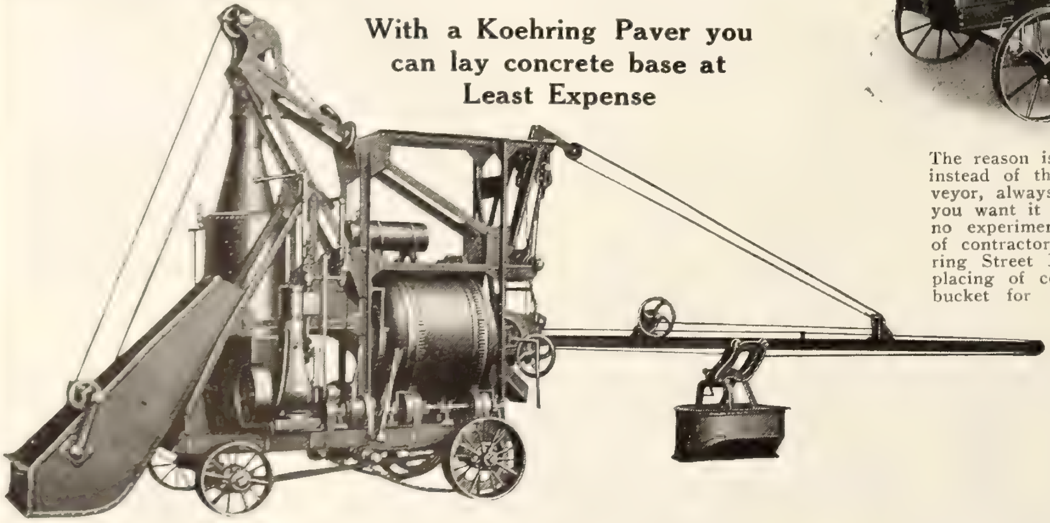

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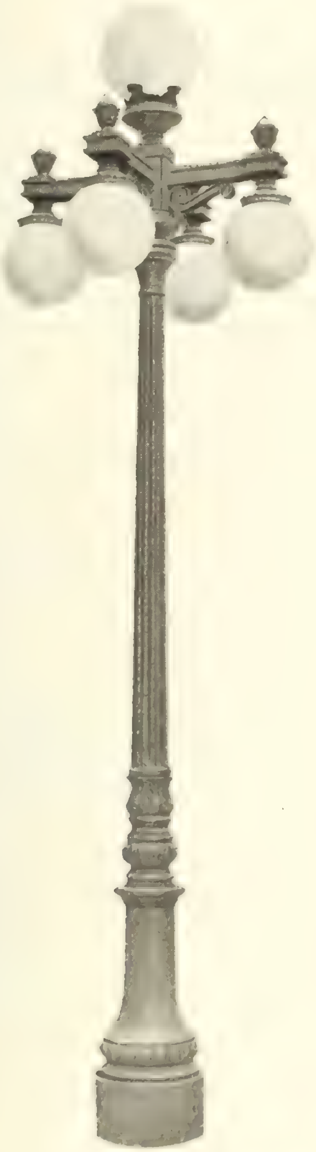

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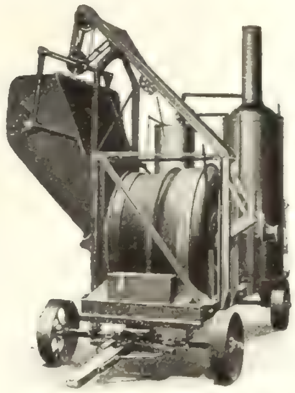

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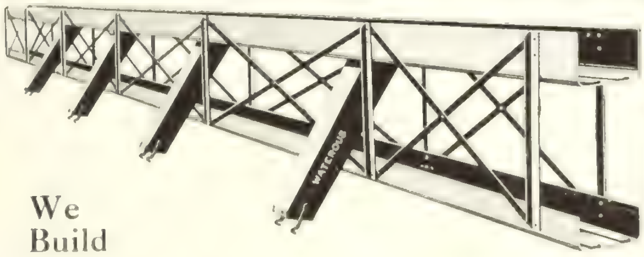

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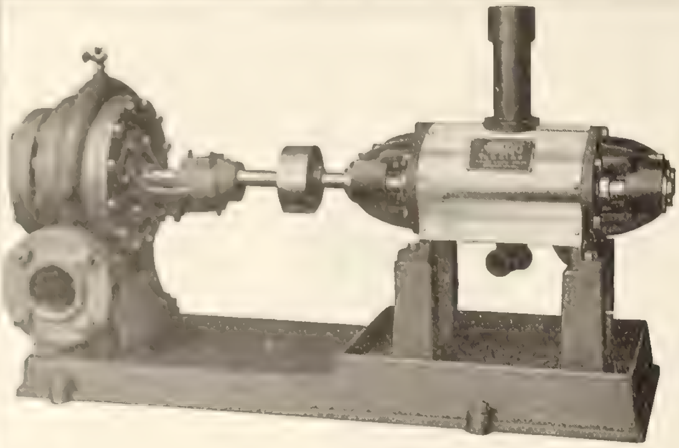

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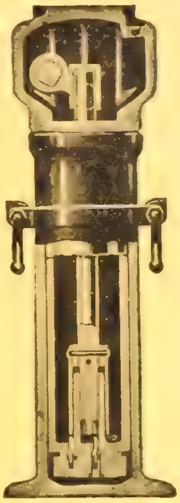

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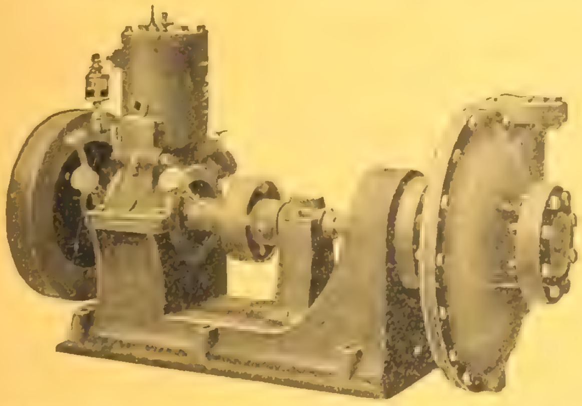

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Continuous and Machine Banded Wood Stave
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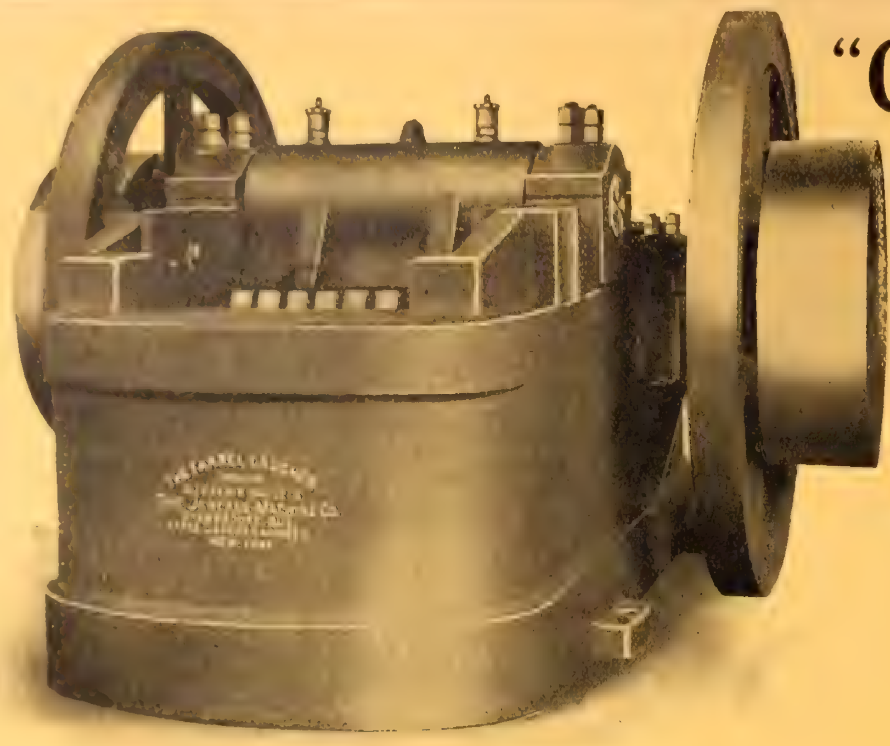

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Complete Crushing Plants

Our Specialty

Many Years Experience and Exceptional Facilities

Ask for Copy of New Catalogue

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General Offices: Sherbrooke, Que. **Works: Sherbrooke, Que. - St. Catharines, Ont.**

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THE "AMERICAN" IS THE PROPER MACHINERY FOR HANDLING SAND

The equipment shown in the illustration, consisting of

An "**American**" Stiff Leg Derrick, a Double Drum Belt Hoist and a Three-quarter Yard Clam Shell Bucket, is handling from **sixty to eighty yards of sand per hour.**

The contractors have been piling up profits with this machinery for two years and it's as good as new to-day,

If you wish to write the owners, we will furnish their names.

Name

Address

Please send information and price on Derricks for Handling Sand

AMERICAN HOIST & DERRICK CO.
St. Paul, Minn.
C. R. 6-12-12

American Hoist & Derrick Company

St. Paul, U.S.A.

Gorman, Clancey & Grindley, Edmonton, and Calgary, Alta. and Nelson, B.C.
Vancouver Machinery Depot. Ltd., Vancouver, B.C.
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When you, Mr. Engineer, plan a building—or when you Mr. Contractor, erect it—you are usually anxious to get it completed as soon as possible.

Delay in completion is certain to cause complaints and confusion—and is likely to cause financial loss.

Therefore, in selecting materials, it is to your advantage to specify the Cement made by the Company best equipped to supply your requirements quickly, for thus you reduce the danger of delayed delivery. The Canada Cement Company's mills—located at Exshaw, Calgary, Winnipeg, Port Colborne, Shallow Lake, Belleville, Marlbank, Lakefield, Hull and Montreal—are so placed as to provide the quickest possible delivery to any point in Canada.

WE HAVE CANADA-WIDE DISTRIBUTION

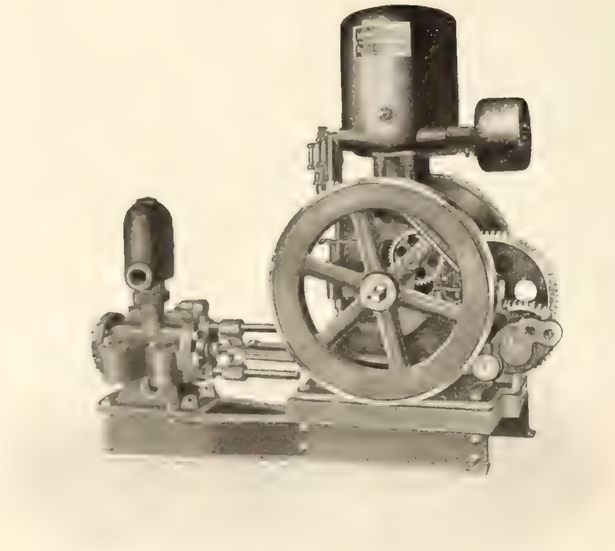
Quick delivery is an important point. Complete delivery of your whole order is even more important. Canada Cement mills have sufficient capacity to completely fill all orders promptly.

Write for "Factories and Warehouses of Concrete."
It will interest you. Enclose 12 cents in stamps for postage.

Canada Cement Company
Limited
No. 62 Herald Building - MONTREAL
Sales Offices: TORONTO - WINNIPEG - CALGARY

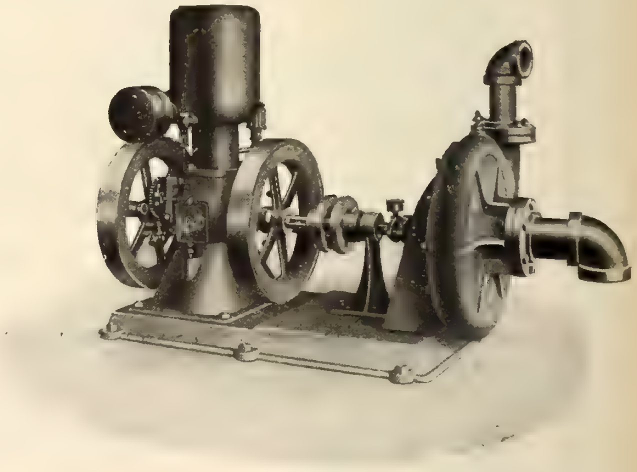
"NOVO"

Gasoline Outfits



We have just been appointed Sole Agents for Canada for the celebrated "Novo" line of Gasoline Power Outfits, and are now carrying stock of same in all our branches.

Due to their lightness and compactness, "Novo" Outfits are the most popular power plants with Contractors, Railways, etc. "Novo" Engines are guaranteed against damage by frosts.



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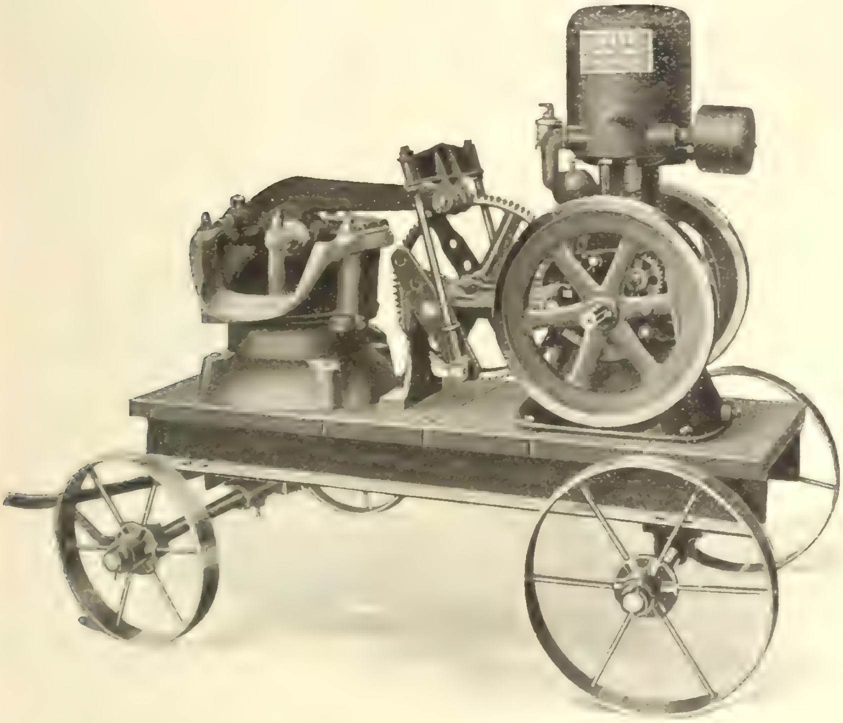
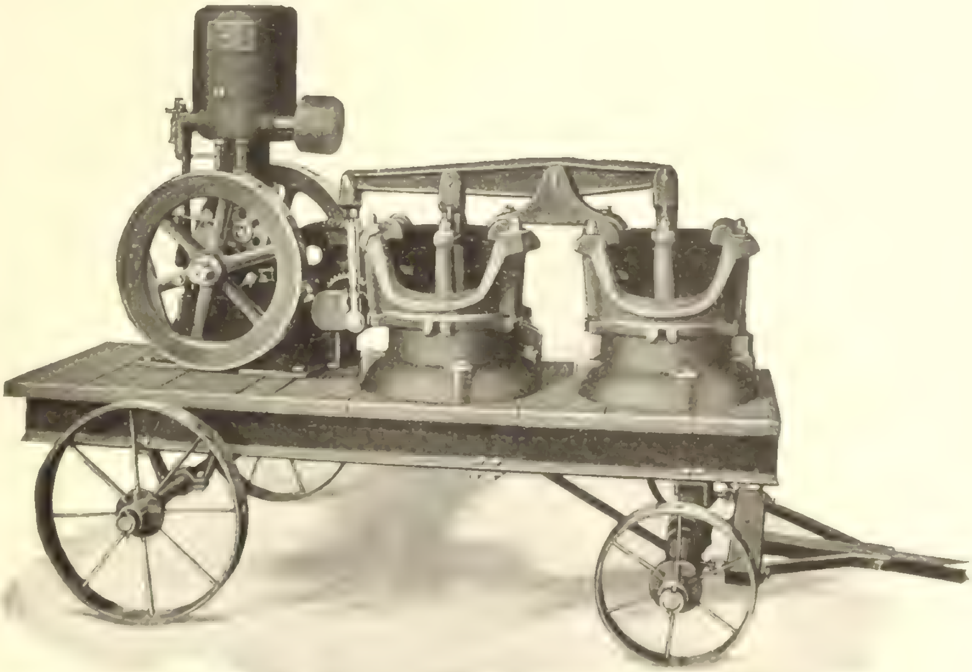


"Novo" Outfits

COMPRISE

Single Diaphragm Pumps
Double Diaphragm Pumps
Centrifugal Pumps
Hoisting Rigs
Saw Rigs, etc.

"Novo" pumping outfits are made in 20 different styles and sizes for all kinds of requirements.



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(Continued on page 12)

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For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.

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Don Valley Fireproofing, Bricks and Tile used throughout.

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Carrere & Hastings and F. S. Baker, Associate Architects.

Don Valley Porous Terra Cotta Fireproofing and 2,000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

Royal Bank, Toronto

Eustace G. Bird associated with Carrere & Hastings, Architects. Norcross Bros. Contractors.

Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Bell Telephone Building

Adelaide Street, Toronto.

W. J. [illegible], Architect. [illegible] Limited, Contractors.

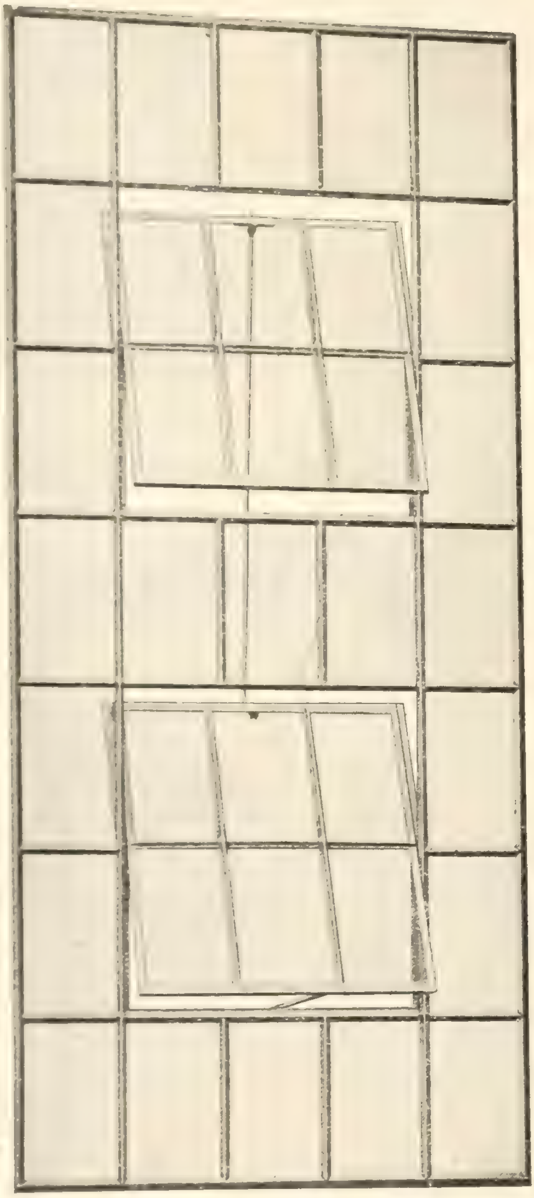
Don Valley Porous Terra Cotta Fireproofing and Brick used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

TORONTO - ONTARIO

LET IN THE LIGHT



"Fenestra"

"Fenestra" TRADE MARK

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,

Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons,
Railroad Shops, Warehouses, Barracks, etc.

We will help you to settle the problem of your window requirements—write us.

STEEL and RADIATION, Limited

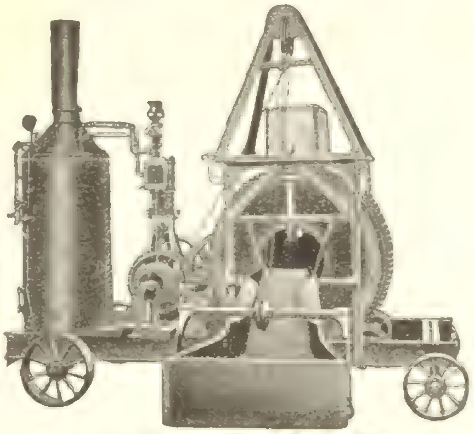
TORONTO, CANADA

Have You Seen Our 1912 Catalogue on Concrete Machinery?

London Automatic Batch Mixer No. 1

It's a dandy 160 pages illustrations.

Showing the Largest Line of Concrete Machinery ever crammed into a catalogue.



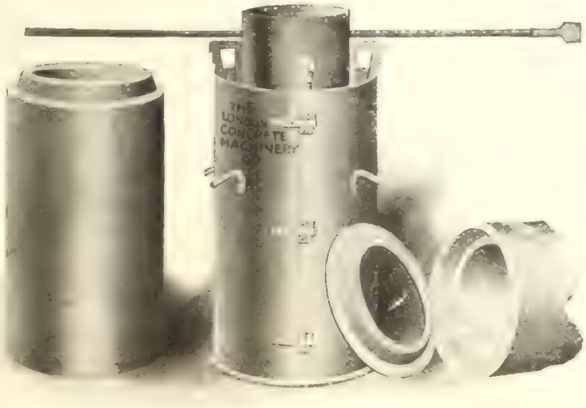
London Standard Drum Batch Mixer

All Made in our Own Factory and under a system producing an Excellence of Quality. Our large output Right from Factory to the Contractor.

Even such remarkably low prices are preferable to exorbitant prices and small output

Some people wonder how we can sell high grade machinery at such low prices

IT IS QUITE SIMPLE

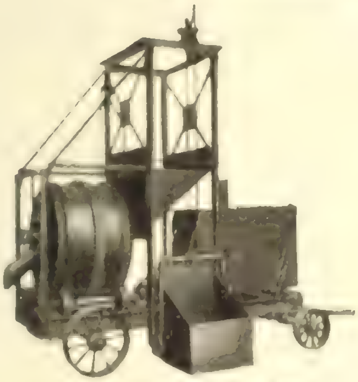


London Sewer Pipe and Tile Moulds

We manufacture over twenty different sizes and styles of

- Concrete Mixers
- Mortar Mixers
- Concrete Block Machines
- Cement Brick Machines
- Cement Tile Machines
- Tile Moulds
- Rock Crushers
- Screen Sand Elevators

Our Enormous Sales and Small Profits are Sufficient Explanation.



London Paving Mixer with Side Lift and Rear Discharge

- Gasoline Engines
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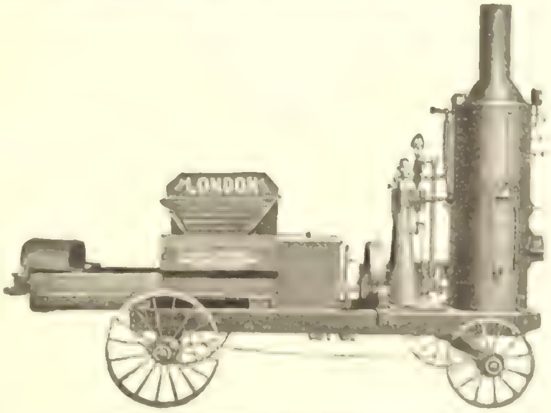
- Sidewalk Forms
- Sidewalk Tile Machines
- Concrete Carts
- Wheel Barrows
- Sill Step and Window Cap Moulds
- A complete line of Cement Working Tools



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London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

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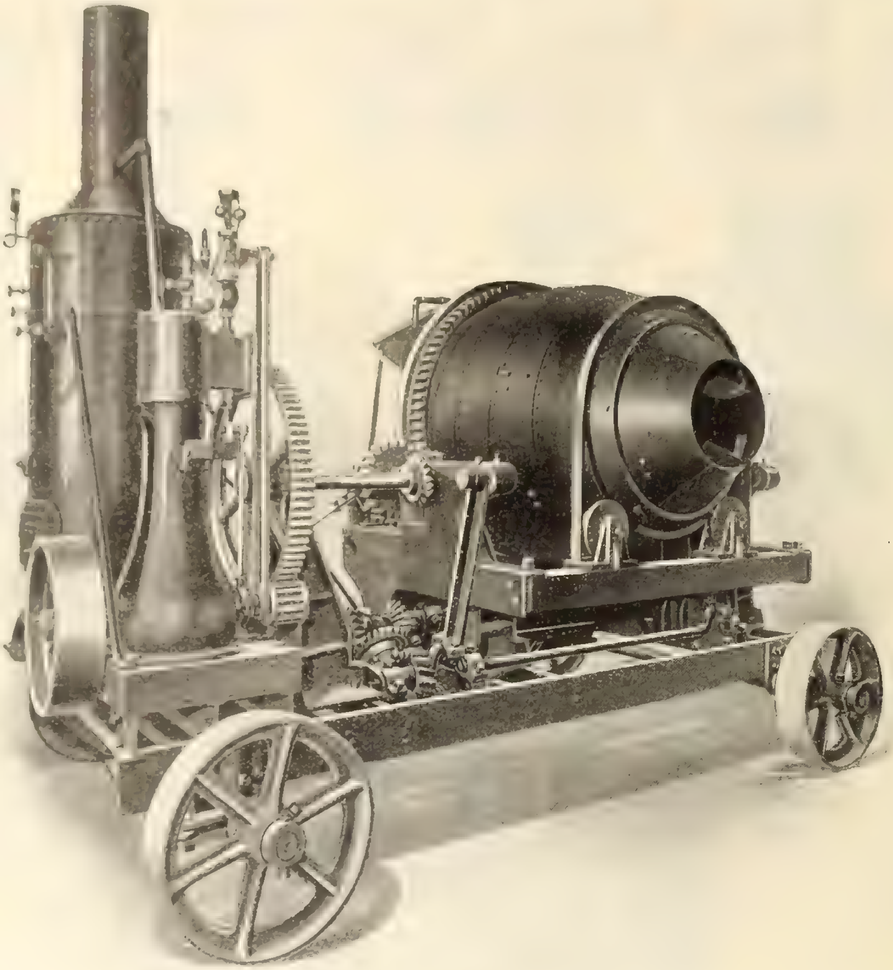
Low Working Cost



Rapid and Perfect Mixing

Maximum Efficiency

The Collossal Success of The Famous WETTLAUFER HEARTSHAPE MIXER

in 1912

is proof of its value to all contractors handling concrete work.

Our success will help make your success if you use a Wettlaufer Heartshape Mixer

in 1913.

See about it now. Send for Catalogue or come and see it working any time at

WETTLAUFER BROTHERS

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ROGERS
Portland Cement

We can supply you with the highest grade cement on the market—our

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are a guarantee of uniform good quality and our

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enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

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For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone—but cheaper.—A perfect imitation—Adaptable to all ornamentation or architectural decoration, both interior and exterior.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

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  Hopkins & Co., F. H.
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  Greening Wire Co., B.
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  Steel Co. of Canada
  Steel & Radiation Ltd.
  Trussed Concrete Steel Co.
  Turner, C. A. P.

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  Greening Wire Co., B.

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  Canadian Mineral Rubber Co.

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  Erie Machine Shops
  Huber Manufacturing Co.
  Lecky & Collis
  Morrison & Co., T. A.
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(Continued on page 14)

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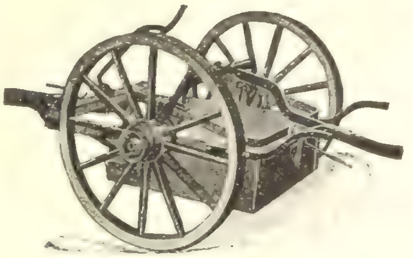

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The Toughest Stone for Macadam in Ontario

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COST FOR REPAIRS	1905	9.35	1910	14.07
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CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

[illegible]
  [illegible]

Safes and Vaults
  Taylor, J. & J

Sand and Gravel
  [illegible] Sand and Material Co
  Sand and Supplies Ltd
  [illegible] Sand and Gravel Co

[illegible]
  [illegible]
  [illegible]

Sewer Joint Asphalt
  Canadian Mineral Rubber Co

Sewer Pipe
  [illegible]
  [illegible]
  [illegible] Sewer Pipe Co.
  [illegible] Thomson Pipe Co.
  [illegible]
  [illegible] Sewer Pipe Co.
  [illegible]rth & Ryan
  Standard Drain Pipe Co.

Sewer Trenching
  Austin Drainage Excavator Co.
  Lecky & Collis
  Mun. Engineering & Contracting Company

Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
  Browning Engineering Co.
  Beatty & Sons, M.
  Canada Foundry Co., F. H.
  Hopkins & Co., F. H.
  [illegible] Works
  Mussens Limited
  Thew Automatic Shovel Co.
  Willis Shaw Mach. Co.

Shovels
  Lundy Shovel & Tool Co.

Smoke Stacks
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
  Cabot, Inc., Samuel
  Pinchin, Johnson & Co

Steam Apparatus
  Canadian Buffalo Forge Co
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Steam Turbines
  McDougall Caledonian Iron Wks.

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  Canada Steel Co., Ltd.
  Dominion Steel Castings Co.
  Lecky & Collis
  Provincial Steel Co.

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  Canada Steel Co., Ltd.
  Factory Products
  Steel Co. of Canada.
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  Britnell & Co.
  Brodie, Jas.
  Christie, Henderson & Co.
  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
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  Anderson, Geo.

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  Hamilton Mfg. Co., Wm.
  Inglis, John
  Jenckes Machine Co.
  Marsh & Henthorn
  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Turner & Sons, J. J
  Woods Limited
  Waterous Engine Works Co.

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  Hunt & Co., Robt. W.

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  Canada Iron Corporation
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  Standard Underground Cable Co. of Canada, Limited

Veterinary Remedies
  Johnson, A. H.

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  Cabot Inc., Samuel
  Can. H. M. Johns-Manville Co.
  Canadian Mineral Rubber Co.
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  Escher Wyss & Co.
  Hamilton Mfg. Co., Wm.
  McDougall Caledonian Iron Wks.

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  Canada Wire & Cable Co.
  Factory Products
  Standard Underground Cable Co. of Canada, Limited

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  Royce Limited

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  Canada Wire & Iron Goods Co.
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Preserves Roads
Prevents Dust~

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ALPHABETICAL LIST OF ADVERTISERS

[illegible] .. 81
[illegible] .. 93
[illegible]
[illegible]
[illegible] Portland Cement Works.. 89
[illegible]
[illegible] .. 91
[illegible] Brick & Tile Co. 92
[illegible] .. 2
[illegible] Works .. 111
[illegible] .. 88
[illegible] & Co., Limited, George 24
[illegible] .. 112
[illegible], James C. 104
[illegible] .. 87
Asphalt & Supply Company 89
Automatic Wood Box & Turning Co. 92

[illegible]
[illegible] .. 107
[illegible]
[illegible], Limited, M .. 34
Bechtels Limited 106
[illegible] .. 31
[illegible]
[illegible] .. 87
Bowman & Connor 104
Britnell & Company, Limited 98
[illegible]
Bremner, Limited, Alex. 103
Brown Hoisting Machinery Company
Brown Machine Company 98
Brodie & Company, James .. ..
[illegible] Company .. 93

Cabot, Incorporated, Samuel 112
Campbell, R. 104
[illegible] Company 3
Canada Foundry Company, Limited 95
Canada Iron Corporation Limited 103
[illegible]
Canada Steel Company 27
Canada Wire & Cable Company 27
[illegible] .. 94
Canadian Boving Company 28
Canadian Bridge Company 100
[illegible] Company .. 114
Canadian Fairbanks -Morse Co., Ltd. 115
Canadian H. W. Johns-Manville Co. .. .. ..
Canadian Kellogg Company 39
Canadian Mineral Rubber Company 14
Canadian Office School Furniture Co. .. ..
Canadian Pipe Company, Limited 24
Canadian Ingersoll-Rand Company 22
Canadian Supply Company .. ..
Ceresit Waterproofing Company .. ..
Chain Belt Company 113
[illegible] 104
[illegible] .. 111
[illegible]
[illegible] Company Limited 103
[illegible] Stone Company 110
[illegible] Plate Glass Company .. .. ..
[illegible] .. 93
Contractors' Supply Co., Ltd. 98
[illegible] .. 88
Corinthian Stone Company 105
Crown Gypsum Company 21
Crushed Stone Limited 85

Dake Engine Company 103
Dennis Wire & Iron Works Company 83
DesMoines Bridge & Iron Company 101
[illegible] Works .. 112
Dominion Bridge Company 100
[illegible] .. 82
Dominion Creosoting Company 86
Dominion Ornamental Iron Company 99
[illegible] .. 19
[illegible] .. 18
Dominion Steel Castings Company 26
[illegible] .. 94
[illegible] Works .. 7
[illegible] Marine Engine & Boiler Co. 36
[illegible]

Elaterite Paint Company .. ..
Engineering Works of Canada .. ..
Erie Machine Shops 112
[illegible] Wass .. ..

Farmer, John F. 104
Ferguson, H. S. 104
Ferranti Electrical Co. 12
Foundation Company .. ..
Fraser, E. M. 104
Fuce & Smith 104

Galt Engineering Company, John 104
Galt Stove & Furnace Company 82
Gardner & Saxby 104
Gartshore, John J. 104
Gartshore-Thompson Pipe & Foundry Co. ... 102
Gaudry & Company, L. H. 109
General Supply Company 28
Gibbs & Canning 113
Goheen Manufacturing Company .. ..
Goodyear Tire & Rubber Co. of Canada, Ltd. 37
Greening Wire Company, Limited, B. 91
Gurley, W. & L. 93

Hagersville Contracting Company 13
Hancock, Jr., H. Syd. 104
Hamilton Art Glass Co., Ltd. 92
Hamilton Bridge Company .. ..
Hamilton Mfg. Company, Wm. 19
Hamilton Pressed Brick Company .. ..
Harvey, J. 84
Heinicke Company, H. R. 18
Hepburn, John T. 33
Hobbs Manufacturing Company .. ..
Hopkins & Company, F. H. 116
Hotchkiss Lock Metal Form Company 85
Hunt & Company Robert W. 104

Improved Equipment Company 39
Imperial Wire & Cable Company 115
Inglis Company, John 21
International Marine Signal Co. 39-92

Jamieson Lime Company .. ..
Jenckes Machine Company 2
Jennings & Ross .. ..
Johnson, A. H. 110
Jones & Glassco 38

Kennedy, James C. 104
Kerr Engine Company, Limited 32
Koehring Machine Company 109

Laurentian Granite Company 84
Laurie & Lamb 1
Lautz Company 25
Lea, R. S. 104
Lecky & Collis 17
Leonard & Sons, E. 85
Linde British Refrigeration Company 23
London Concrete Machinery Company 9
Lundy Shovel & Tool Company 97
Luxfer Prism Company 96

MacLean Daily Reports 108
Mahan & Company .. ..
Marsh & Henthorn, Limited 82
McDougall Caledonian Iron Works Co., John 81
McDowall, R. 104
McKinnon Holmes & Company .. ..
McMillan & Sons, W. .. ..
McNeil & Company, William P. 102
Meadows, George B. 39
Metal Shingle & Siding Company 90
Metallic Roofing Company 83
Miller & Company, Geo. M. .. ..
Missisquoi Marble Co., Ltd. 92
Mitchell Company, Limited, Robert 100
Montreal Locomotive Works Limited 85
Morrison & Company 104
Mussens Limited 4
Myers, Oakley 85

Napanee Iron Works 17
National Bridge Company of Canada 101
National Iron Works Limited 103
National Pipe & Foundry Company 102
Neptune Meter Company 101
Noble, Clarence W. 83
Northwestern Terra Cotta Company 94

Ontario Asphalt Block Co., Ltd. 89
Ontario Sewer Pipe Company 18
Ontario Wind Engine & Pump Co. 85
Ormsby Limited, A. B. 20
Oshawa Interior Fittings Company 88
Owen Sound Iron Works 111

Pacific Coast Pipe Company 1
Paterson Manufacturing Company 15
Pedlar People 35
Phoenix Bridge Company 94
Piggott & Company, Thomas 110
Pinchin Johnson & Company 114
Power & Son .. ..
Provincial Steel Company 26

Queenstown Quarry Company 103

Reid & Brown 104
Rhodes Curry Company, Limited 87
Rogers, Limited, Alfred 11
Roman Stone Company 30
Royce Limited .. ..

Sackville Freestone Company, Limited 34
Sand & Supplies Limited 102
Sarnia Bridge Company, Limited 101
Sawyer Belting Company 13
Sheldons Limited 20
Sheppard, James .. ..
Silcox, A. B. 112
Slack & Company, T. 84
Smart-Turner Machine Company 1
Smith Limited, Thos. & Wm. .. ..
Smyth & Ryan 94
Standard Ideal Company 40
Standard Steel Construction Co. 101
Standard Underground Cable Co. of Canada 19
Stanley Company, W. F. 39
Star Expansion Bolt Company 19
Steel Company of Canada 26
Steel & Radiation 8
Stinson-Reeb Builders' Supply Co. 40
Structural Steel Company 100
Sturtevant Co. of Canada, Ltd. B. F. 27

Taylor, J. & J. 111
Thew-Automatic Shovel Company 36
Toledo Wheelbarrow Company 110
Toronto Plate Glass Importing Co. 1-94
Toronto Iron Works 89
Troy Wagon Company 88
Trussed Concrete Steel Company 98
Tuec Company 90
Turner, C. A. P. 96

United States Steel Products Co. 29
United Typewriter .. ..
Urschel-Bates Valve Bag Company .. .. ..

Waterous Engine Works Company 113
Weeks, Arthur L. 104
Welch & Company, H. J. 104
Western Canada Contractor 98
Western Wheeled Scraper Company 13
Wettlaufer Bros. 10
Woodstock Wind Motor Company 99
Wood and Service 104
Wooliscroft & Son, G. .. ..

York Sand & Gravel Company 98

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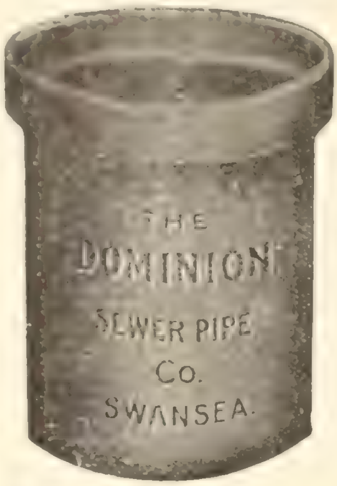

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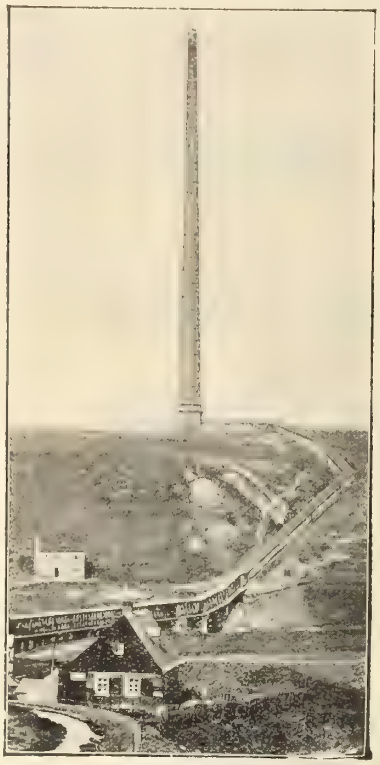

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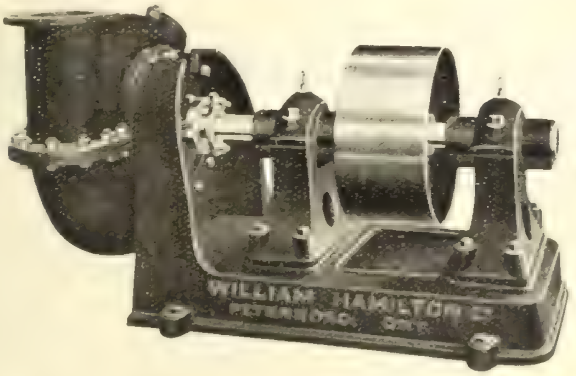

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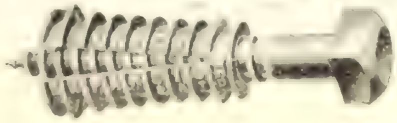

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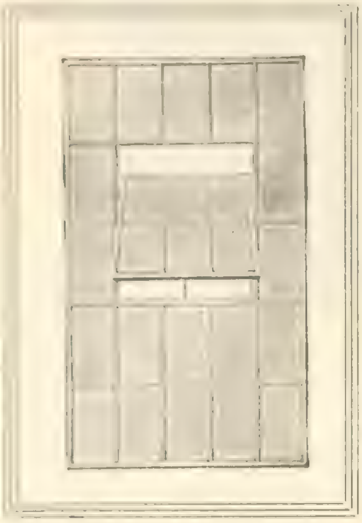

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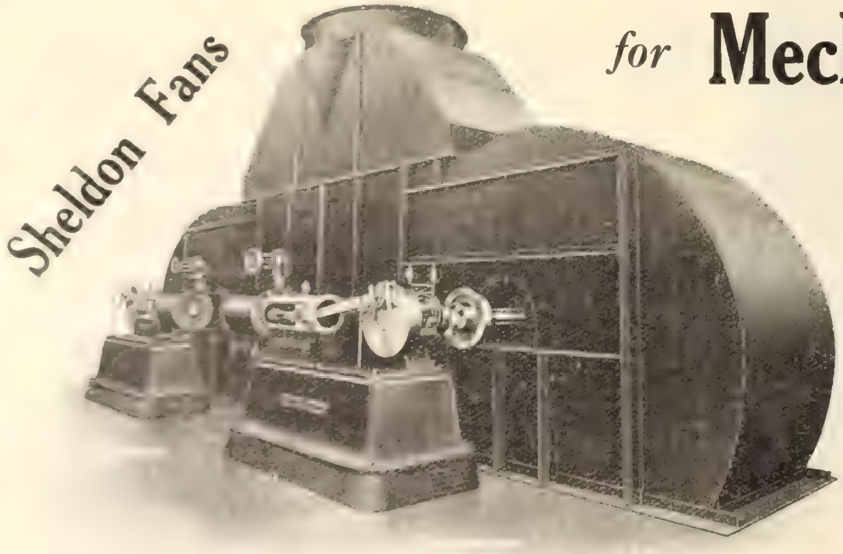

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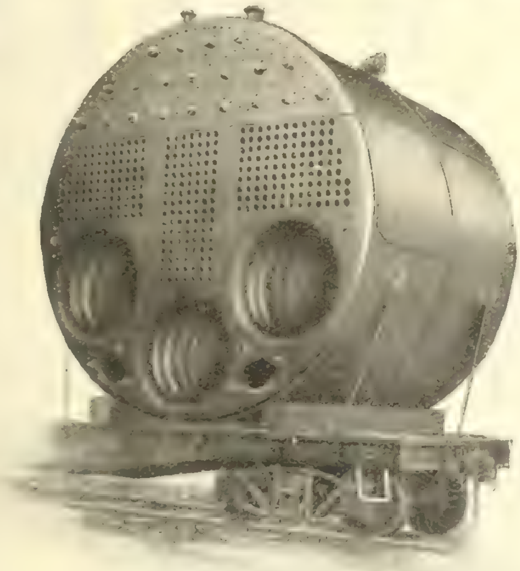

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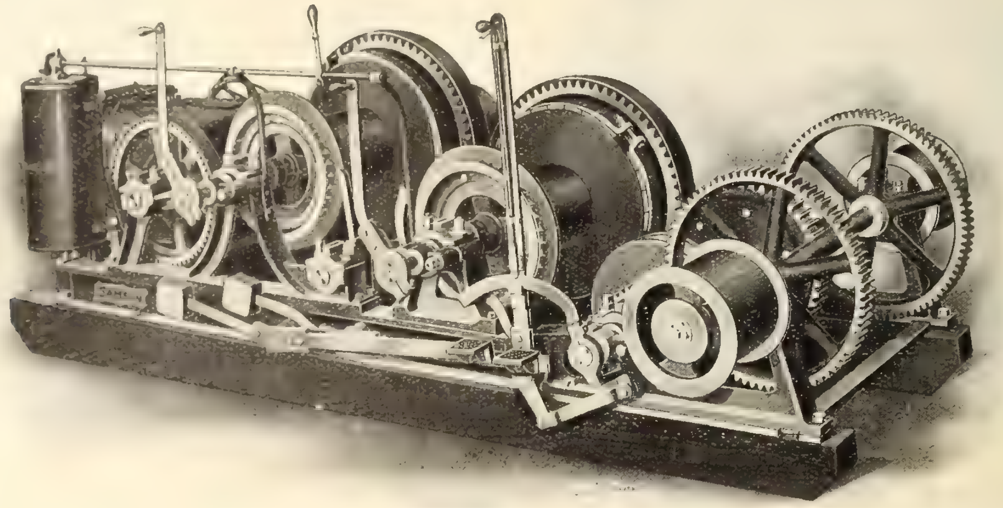
DERRICK HOISTS



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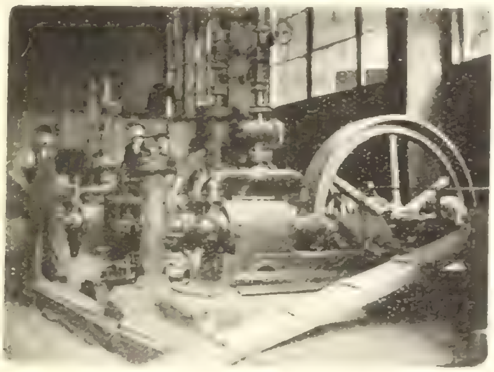
has the largest output in the world of refrigerating machinery.



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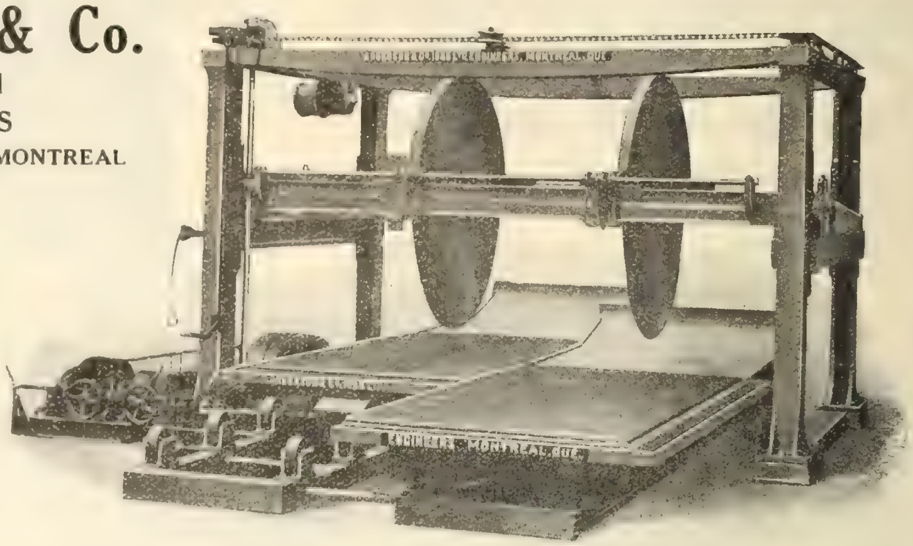

Anderson's Rising and Falling Diamond Saw, made under British and U. S. A. Patents 209179, 657262 SINGLE AND DOUBLE TABLES

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Galvanized Wire Wound and Continuous Stave Pipe for Water Works, Power, Irrigation, etc.

Withstands 250 lb. working pressure.

Not affected by Frost, Corrosion, Electricity or Acid. Water Works Systems installed. Prompt attention to inquiries.

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60 Tons 25 lb. Rails, Ready for Shipment
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	3/8 to 2-in.	3/4 x 1/8 to 4 x 1	3/4 x 1/8 to 2 1/2 x 1/2

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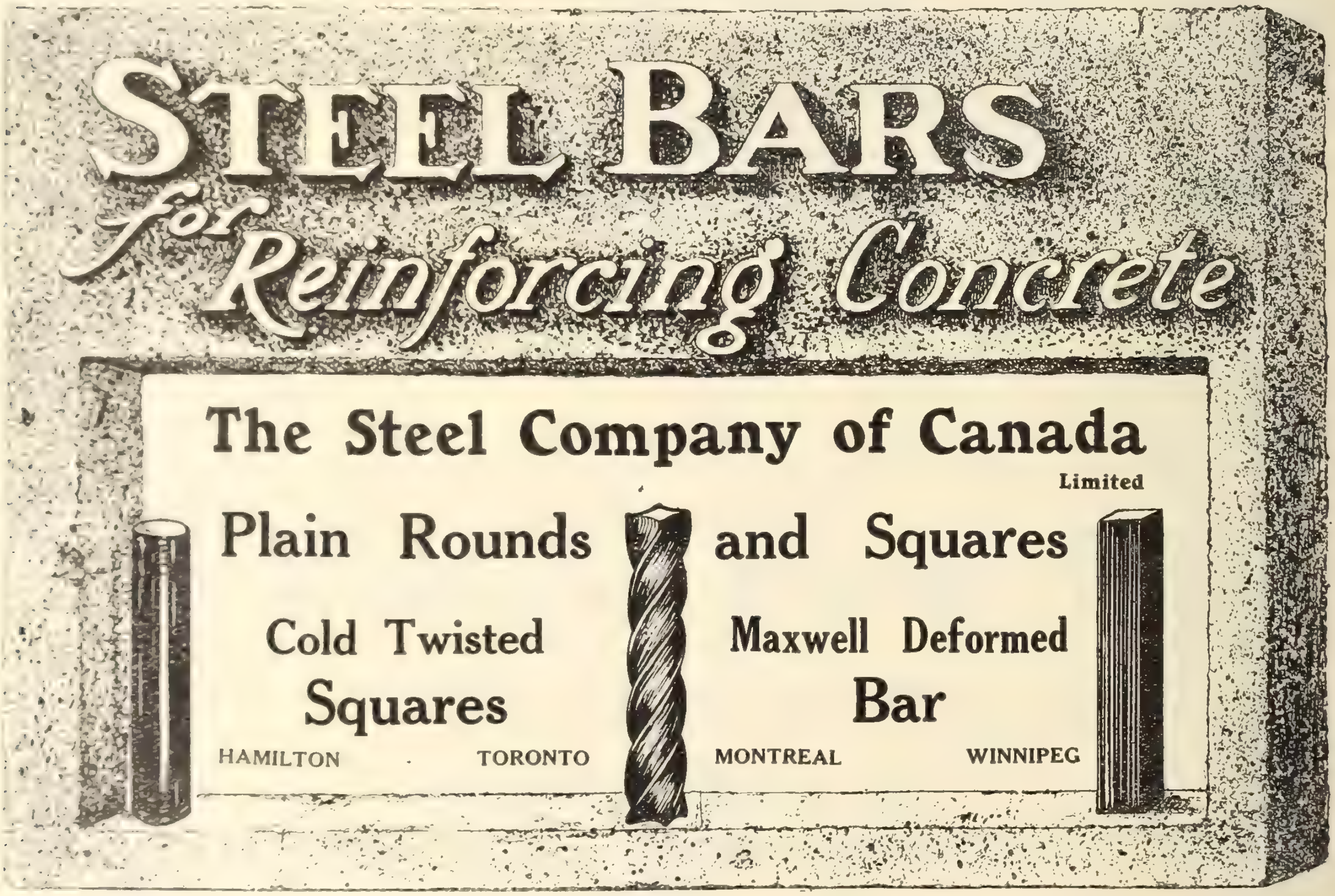

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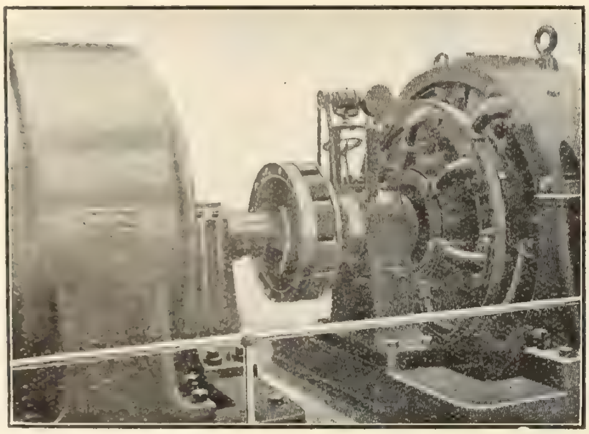

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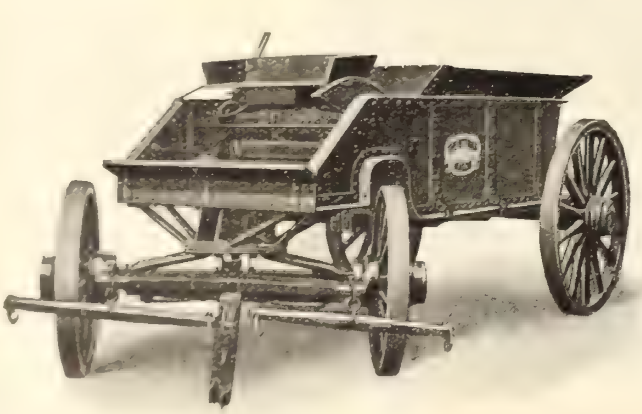

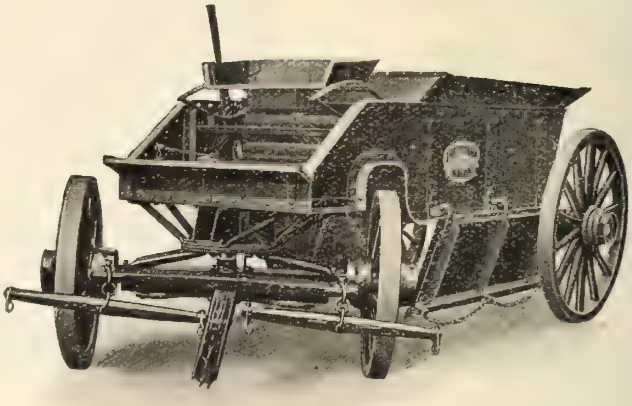

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are the latest development in Dump Waggons, and the original cost is no higher than inferior makes.

Strong, light, everlasting, first cost is last cost.

Let us demonstrate the superiority of this Dump Waggon over all others.

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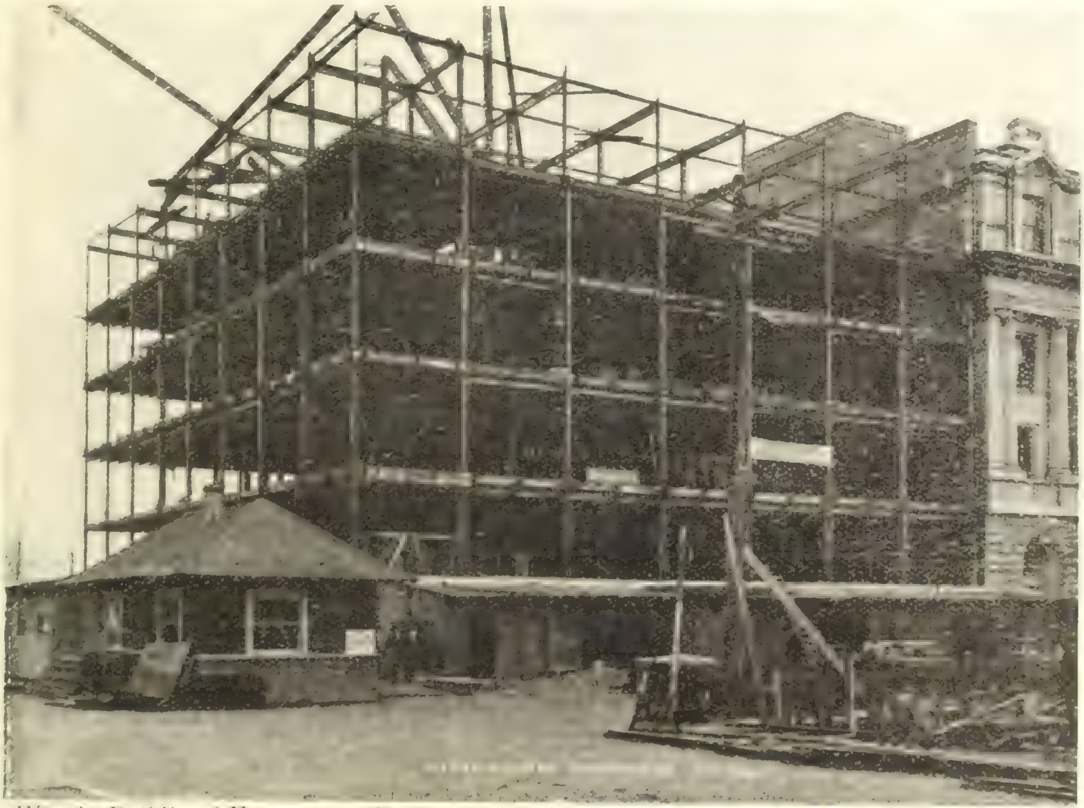
TRIANGLE MESH
CONCRETE REINFORCEMENT



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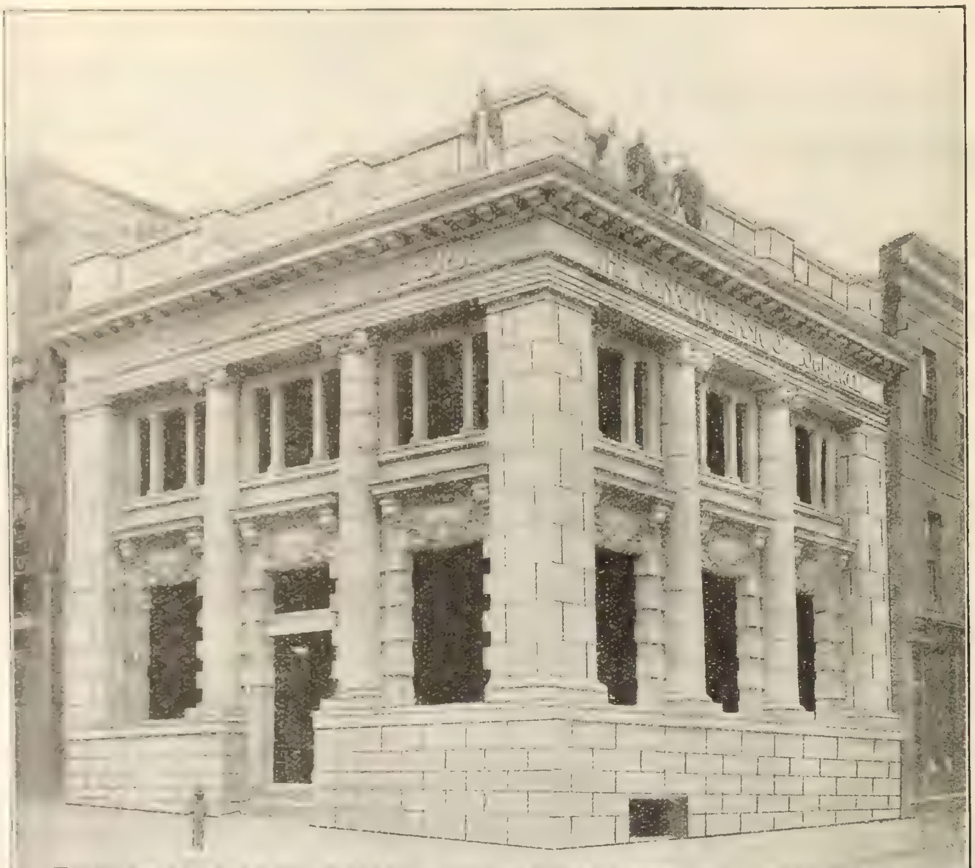

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This illustration shows the Bennett System of Segmental Arching in course of construction on the O'Keefe Brewery Company's new building—Toronto.

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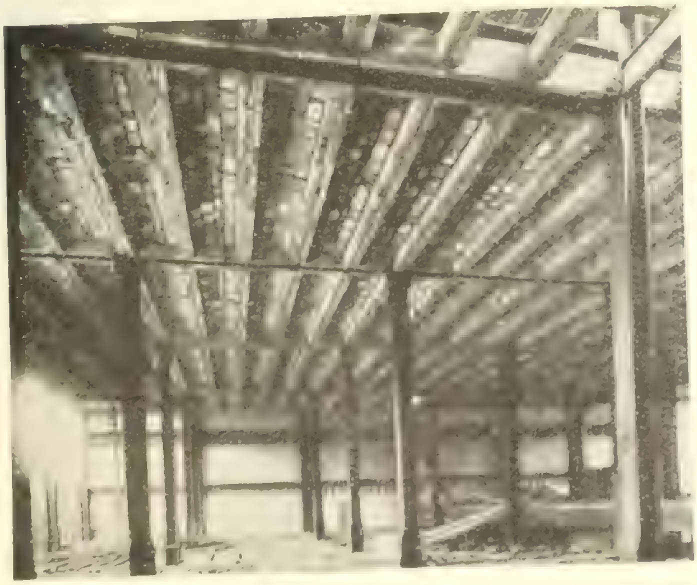

This illustration shows the finished floor and ceiling underneath.

We make a specialty of this particular kind of hollow tile work.

Our workmen are experienced and our equipment up-to-date.

We guarantee first-class workmanship at the lowest cost.

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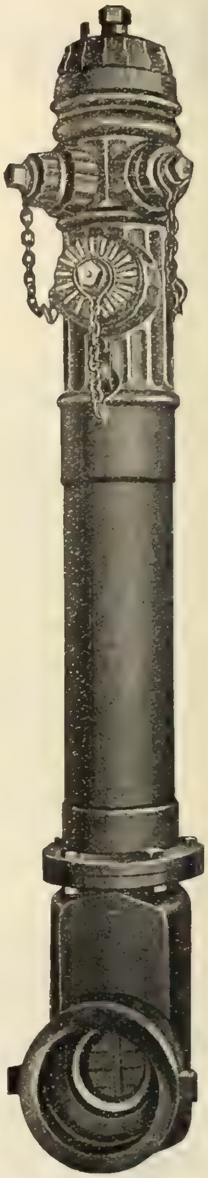

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" KERR " are known from coast to coast for the reliable service they always give.

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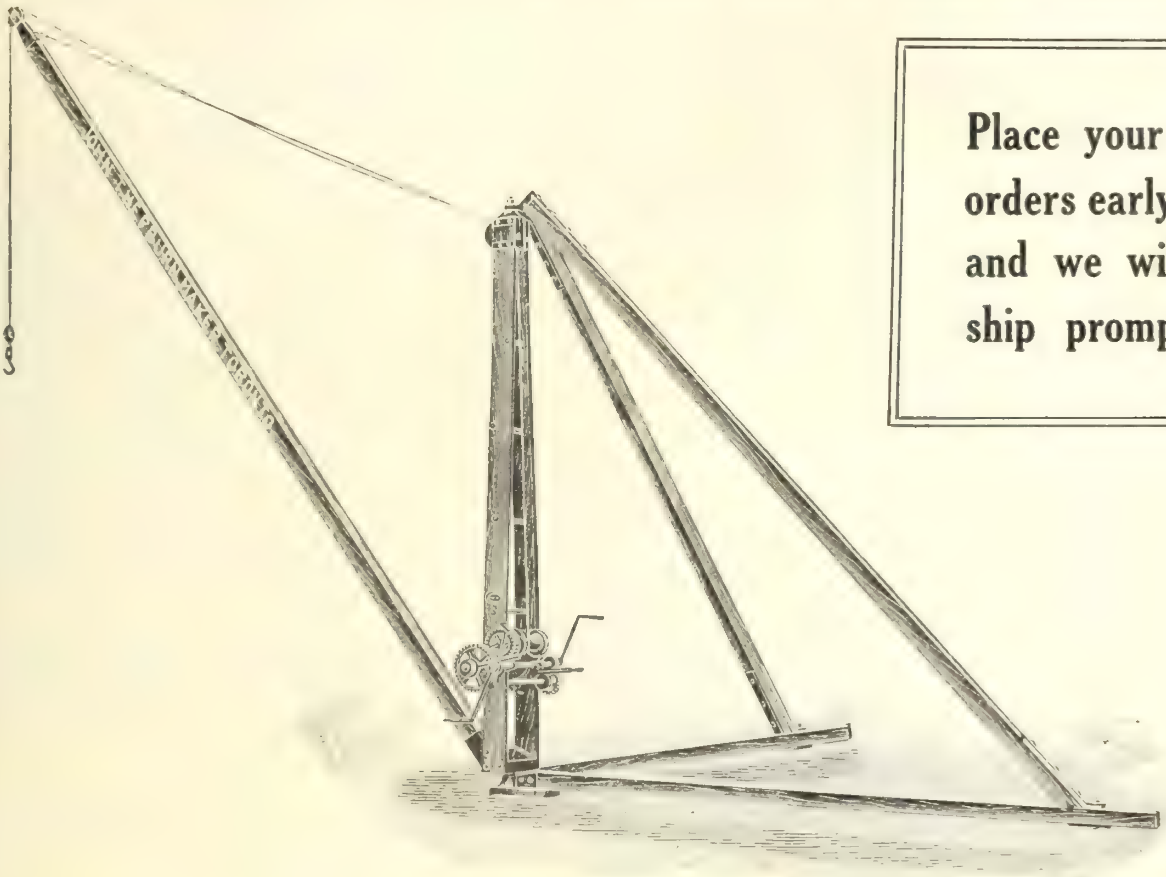
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You cannot see the Hoisting Engine in the picture but it is there, ready at all times and equal to any work it is called upon to do.

This accounts for our receiving the larger portion of orders for engines used on this class of work.

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May we send you new descriptive matter covering our Engines and Buckets, etc. We'll be glad of the chance.

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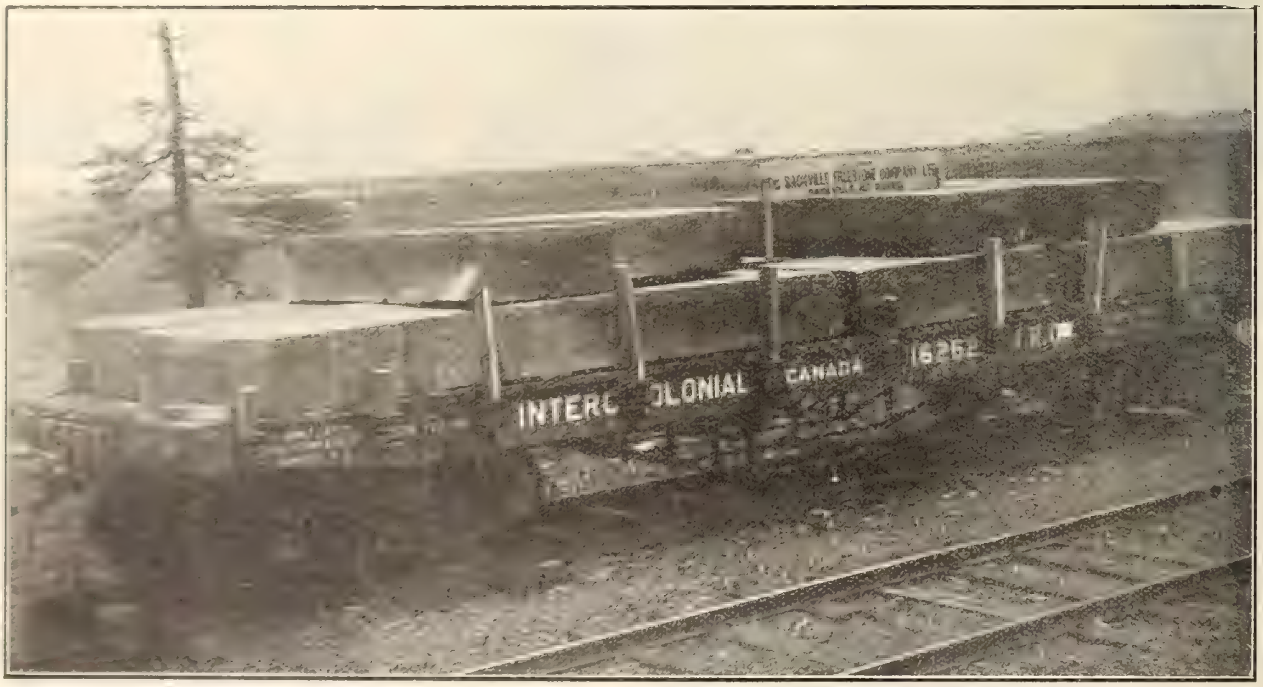

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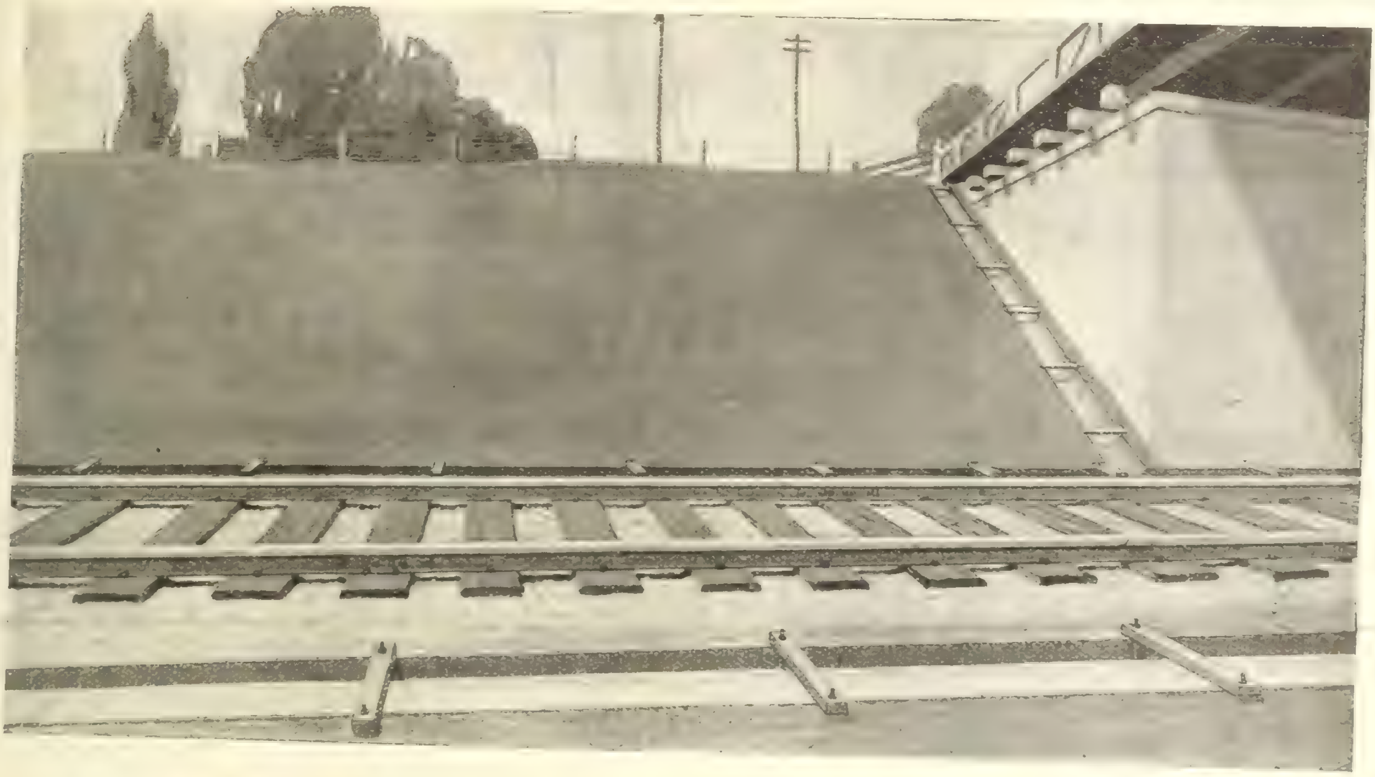

Pedlar Sectional Flume for Railroad Use

Pedlar Railroad Installations

For railway and industrial purposes, the Pedlar People manufacture riveted culvert in Toncan Metal, and Sectional Flume for either elevated or surface transportation of clean or drainage water.

These products meet special railroading conditions of drainage, and make permanent ice-proof and frost-proof installations, not subject to corrosion.

Information and specifications calculated to meet special railroading conditions will be supplied for the drainage of narrow cuttings, side-hill embankments, tunnels, etc., where standard practice must be departed from.

BESIDES Pedlar Riveted Culvert, which can be used for special drainage purposes to tunnels, Pedlar Sectional Flume can be installed for the drainage of side ditches, the protection of bridge foundations and embankments and general surface drainage, where no load is carried. Pedlar Flume is made in

TONCAN METAL

and comes in nested sections about 8 ft. long. These sections have double corrugations at the ends, and lock into each other, being held in position by a curved rod bolted against a cross piece of wood, which secures the sections firmly together. This construction is permanent, and prevents the choking of ditches. Sections will be perforated to specification for the inflow of drainage water.

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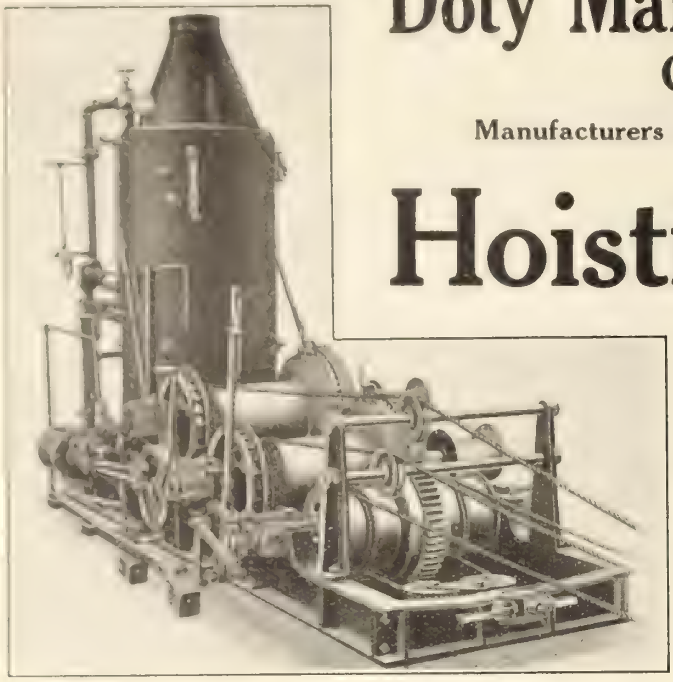
Manufacturers of **Superior**

Hoisting Engines



This cut illustrates our Standard Double Cylinder Double Drum Hoisting Engine with Derrick Swinger attached. "Superior to any other on the market." All parts constructed, guages and templates and every engine tested under steam.

Derrick Swingers, Material Elevators, etc.

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Contractors, Mines and Quarrymen

A full line of Hoisting Engines, with Boilers to pass inspection in any province, kept in stock by The Doty Engine Works Co., Winnipeg, Man., and also at our

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The Thew Shovel is popular because it can do the work.

There is no other shovel of equal weight and dipper capacity that can handle as difficult material, nor under equal conditions, as large an output as the No. O Thew.

Investigate the Thew Horizontal Crowding Motion.

Write for Catalog and Information

THE THEW AUTOMATIC SHOVEL CO., Lorain, Ohio

A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE 50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

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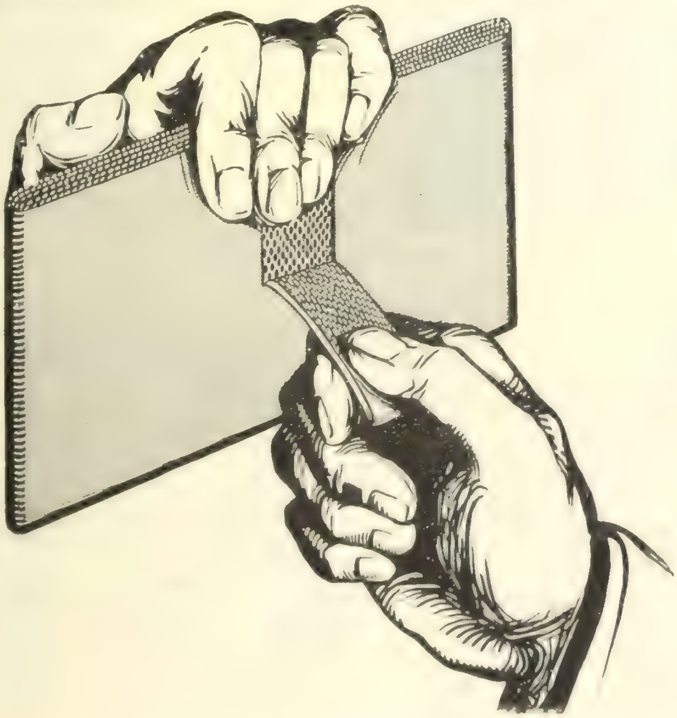

Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard-twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit—and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS A TOTAL OF 72,000 FEET

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If we have not yet the belt you require we will make it for you.

In the choosing of belts our booklet would be of great assistance to you. We supply it free. Write to our nearest branch for one.

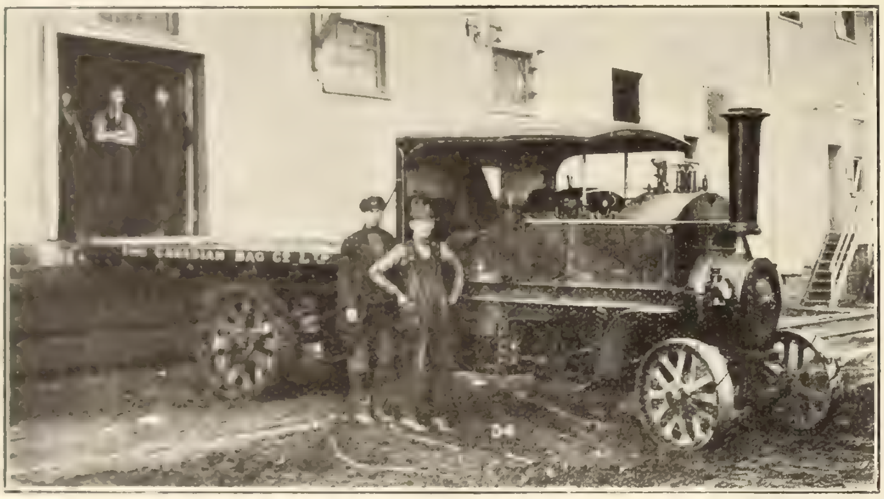
The Goodyear Tire and Rubber Company of Canada, Limited

Factory, Bowmanville, Canada

BRANCHES: Victoria, B. C. Vancouver, B. C. Calgary, Alta. Regina, Sask. Winnipeg, Man. London, Ont. Hamilton, Ont. Toronto, Ont. Montreal, Que. St. John, N. B.

Foden Patent Steam Truck

The most up-to-date, economical and reliable method of hauling Brick, Sand, Stone, Structural Steel, etc. up hills and over rough roads.



Various types of bodies may be fitted to trucks to suit conditions

"Foden" 6 ton trucks at work in Montreal.

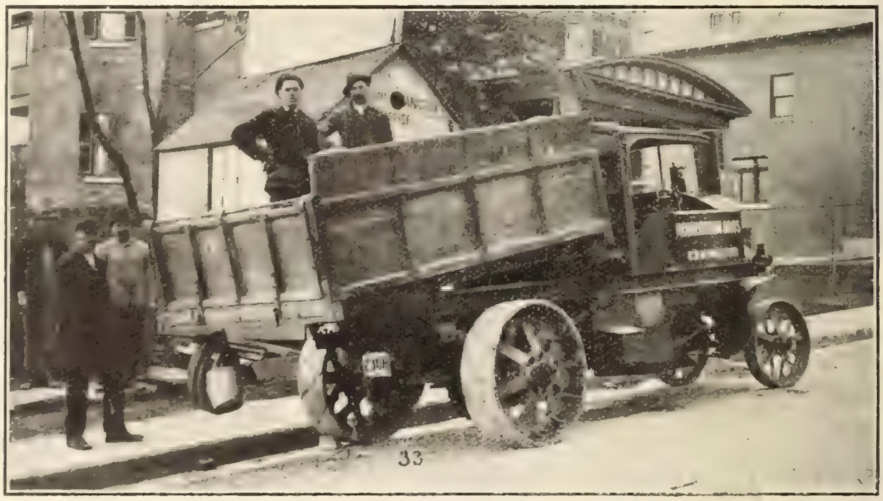
The upper cut illustrates a Lorry type and the lower a Tipper.

Note inexpensive steel tyres 12″-14″ face.

20 sold in Canada last year and **21** at present on order including repeat orders.

Independent of gasoline which is soaring in price; dependent only on **Coal or Coke, and Water.**

We stock repair parts.



Unloading face-brick by hand—Box partly dumped. For unloading ordinary brick, stone, sand, etc., box may be fully dumped, mechanically

Fodens Ltd. are the oldest and largest manufacturers of Steam Trucks in the world.

We have Foden Trucks now running in Montreal, Toronto, Winnipeg and Vancouver.

Write for Catalogue and particulars, and to insure Prompt Delivery, Order Early.

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Canadian Agents **Registered Engineers**

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Made in Two Sizes

SIZE NO 1—

8,000 Candle Power, operates 12 Hours on 18 lbs. Carbide.

Price F.O.B. Ottawa $95.00.

SIZE NO. 2—

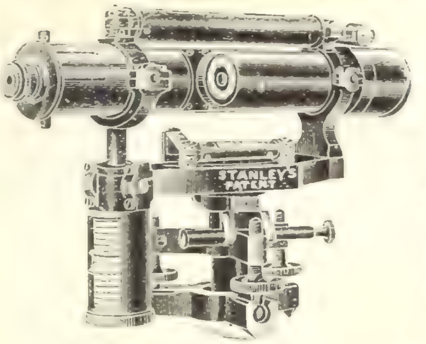
1,000 Candle Power, operates 12 Hours on 8 lbs. Carbide.

Price F.O.B. Ottawa $65.00.

Manufactured by

International Marine Signal Co.
Limited
Ottawa, Canada

TRADE STANLEY MARK



Stanley's Gradiometer saves much time in Railway and Drainage Works. Can be divided to read either ordinary or percentage gradients. Illustrated phamphlet on application.

The Largest Manufacturers of Surveying and Drawing Instruments in the World.

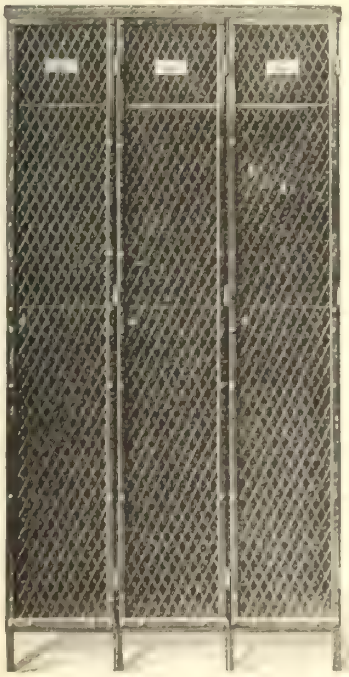
Drawing Office Stationery of all kinds supplied on the most favorable terms. A very large stock kept.

Please send for our catalogue "K 91" and compare our prices with those of other *first-class* makers.

We were awarded four Grand Prix and a Gold Medal at the Turin Exhibition, 1911.

W. F. Stanley & Co., Limited
Great Turnstile, Holborn, LONDON, ENGLAND

The Up-to-Date Building



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If you appreciate good value and rigid construction in a locker, you will use MEADOWS' METAL LOCKERS on your next contract.

Send for our illustrated booklet entitled
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Toronto Wire, Iron and Brass Works Co. Limited
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RADIAL BRICK CHIMNEYS

Our long and varied experience enables us to arrive at definite and proper conclusions regarding chimney building, and we are ready and willing to give prospective customers the benefit of our experience. We have many chimneys in successful operation throughout Canada and the United States.

Write our nearest office for
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Limited
MONTREAL TORONTO WINNIPEG
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ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY
HUGH C. MACLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
VANCOUVER - Tel. Seymour 2013 - Hutchison Block
NEW YORK - Tel. 3108 Beekman - Tribune Building
CHICAGO - Graceland 3748 - 4059 Perry Street
BOSTON - - - Main 1024 - - - 643 Old South Building
LONDON, ENG. - - - 3 Regent Street, S.W

SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers Page 16

Vol. 27 February 12, 1913 No. 7

Improved Prospects for Record Year

THE prospects for 1913 have brightened considerably during the last week or two, particularly in Eastern Canada, where remarkably open weather has prevailed in many localities. Building and contracting operations have been prosecuted to an unusual extent and, with the most open winter in years, the opportunity that has been afforded of cleaning up outstanding jobs has been taken every advantage of with a view to an early start upon new work in the spring.

In 1912 the difficulty of obtaining supplies brought many anxious moments to contractors, and some anxiety has been expressed as to what the situation will be in 1913. We have heard recent complaints concerning delay in obtaining supplies. If such is the case at this slow season of the year the outlook for the busier time ahead is hardly encouraging. The inadequate provision of the railway companies for the handling of freight is largely responsible for the trouble. Dissatisfaction is still heard in connection with the "bunching" of cars. There are not lacking instances of where a consumer has had to wait days without receiving delivery and then have the cars, whose shipment has been distributed over a considerable period, delivered to him at one time. Naturally the unloading of these large quantities causes trouble, especially in view of the fact that the railways stand firm in regard to their demurrage charges.

The cement companies are anticipating a record year. The market is firm and while there has been no appreciable change in price there is a stiffening tendency. At Toronto, cement in large quantities is quoted at $1.40, sacks extra, and car lots at $1.55. City quotations are around $1.80. It is hardly necessary to say that every grade of brick is in active demand all over the country. Manufacturers of crushed stone are hard put to meet orders and with the present brisk demand it may be ventured that consumers are not likely to buy more profitably than at the prices now obtaining. Lead is commanding higher prices than have obtained for years and people who are considered well informed in this line of business look for a drop in prices. The market in steel remains firm, and with an ever-increasing demand for this product from all over the continent, prices are likely to show an upward tendency before long.

The high price of lumber is not likely to exhibit any change for the better, for the reason that stocks are low and that the output this season, while not definitely estimated, is at least 25 per cent. lower than last year. Under a continuation of the present conditions of the lumber market, certain types of building construction will be affected. The particular effect will be felt in speculative building.

With a season of record activity in prospect, contractors will be well advised to watch the market closely and to take advantage of every opportunity of profitable buying before the rush of the active constructional season sets in.

The Good Roads Movement

GOOD roads have now become one of the active issues of the Dominion and every province is doing its utmost to establish a creditable record. In this connection it is of interest to note that Canada's first good roads exhibition will be held in Toronto, February 26th to 28th, concurrently with the exhibition of the Toronto Motor Show.

The Good Roads Educational Association of Ontario, which was formed recently, is doing its utmost to awaken enthusiasm in this important subject throughout the province of Ontario, and no pains will be spared to make the convention a success. The convention will be held in the Dairy Building of the Exhibition Grounds at Toronto. Delegates will be present from the majority of cities, counties, towns and villages throughout the province and highway officials from various parts of the United States and Canada will be present and address the gatherings on various phases of the subject. Some of the speakers will be: Hon. L. W. Page, Director of the United States Office of Public Works; Sir Lomer Gouin, Premier of Quebec; Col. Sawyer, Chairman of the Massachusetts Highway Board; Sir Edmund Walker, President of the Canadian Bank of Commerce; Hon. Dr. Reaume,

A Calgary-Featured Issue

The delegates to the Seventh Annual Convention of the Canadian National Association of Builders' Exchanges (Calgary: Tuesday, February 18th to Thursday, February 20th) will doubtless find special interest in the information relating to the engineering and constructional development of Calgary, and the Province of Alberta, published in this issue. The provisional programme of the meeting was published in our issue of January 15th. This journal is represented at Calgary by Mr. W. W. Hay, Secretary of the Builders' Exchange, who will be pleased to furnish any desired information and to receive communications for publication.

Minister of Public Works for Ontario; Mr. W. A. McLean, Provincial Engineer of Highways for Ontario.

In addition to a consideration of the proposed measure of the Government in taking up the whole highway problem, other subjects for which discussion will be heard are county road organizations, construction of county roads, road maintenance, improvements of pavements, etc.

The good roads exhibition, which will be held in the large annex to the convention hall, will be a special feature of this year's convention and will doubtless prove both interesting and instructive. Demonstrations in the practical side of road building will be given and an opportunity afforded to compare the various methods of road-making and the types of machines in use.

Not only is the Ontario provincial legislature taking up this matter of road betterment, but the Dominion Government, also, is proposing to take definite steps in supporting the province in highway improvements. Undoubtedly this convention will assist very largely in educating the people on the benefits of good roads.

Theoretical Training of the Engineer

THEORY is one of those words that it is impossible to define accurately, comments our London contemporary, The Engineer. It probably means knowledge of the natural laws: that is, laws that cannot be modified by man's interference. As nothing can be effected in engineering without observance of those laws, it follows that every engineer uses theory in his daily work. When theory has become so ingrained in our natures that we no longer observe it as a separate entity we call it practice. The design of gearing, for example, depends upon quite a number of so-called theories. There are, to name a few of the more obvious, conservation of energy, relative motion, rolling contact, the strength of materials, friction, etc. But many of these things have settled down to a definite condition. The shape of teeth, for example, settles at once all questions concerned with root strength, rolling contact and friction. They are all lumped together, and, as a rule, it is waste of time and energy to consider them individually. Thermodynamics is a highly theoretical subject—that is to say, it is concerned with the natural laws controlling the conversion of heat into work. Every internal combustion engine must be made to accord with these laws. Hence, everyone who designs a gas, oil or petrol engine uses theory. But here again it has become established, and he is barely, if at all, aware that he is employing it. If some question arises and the theta-phi or some similar diagram has to be used, theory seems to come a step nearer, because we are going back to fundamental laws. But the more and more common the use of such diagrams become the less will they be regarded as theory. No one regards the mensuration of an indicator card as an effort of theory, and yet many theories are involved. If we examine the card more closely and speak of adiabatic expansion, variable specific heats, and so on, we approach again the sphere of what is called theory. But each step must follow on one that precedes it, and the most precise theoretician does not trace the theory back further than he needs. He goes just so far that he gets on to solid ground, and he builds up from that. What is theoretical knowledge to-day will cease to become theoretical to-morrow, for as soon as a new law is firmly grasped and we apply it in practice, we cease to speak of it as theory. When we can repeat a phenomenon over and over again at will we say that we have established a law; it is of these laws once established that the engineer makes use. There is by now a very large number of them, and the question we have to consider is how far it is worth while for the student to investigate them all. Occasions do arise when we desire to impose conditions that have never before been imposed. The formulation of the laws which we are accustomed to handle then fail us. We have to go back to root principles, and it is necessary to understand the theory underlying the laws to find out in what manner they apply. Now, in actual every-day engineering, for the sake of making money—the end and object of all engineers, save a minute fraction of every hundred—the established formulae can be applied without much difficulty. How far, then, is it worth while spending time acquiring theoretical knowledge? We may put it in another way, and call theory the "science" of a subject, whilst we call the application of that science technology. Now, in manufacturing there can be no question that technology is the thing that pays. Take a case. We are apt to consider that the invention of the Diesel engine was a brilliant triumph of science and theory. But if anyone will read the whole history of the development of the Diesel engine he will see that the theory of constant combustion was almost common property at the time, and the success of the Diesel engine was due to the work of the mechanical engineer or technologist; indeed, it is said by several authorities that as it is now known it differs materially from the theoretical engine of its inventor. The motor car itself is a brilliant example. It has been brought to its present perfection by technology, by secular improvements effected step by step in the workshop. The aeroplane tells the same story. How to fly has been found out by laborious trial and error; the science of flight follows behind and consolidates the foundations. The modern view of science is that it is its business to say **how** such a thing happens, not **why.** We learn from it how a gas expands—by the bombardment of particles—not why; how a body falls to the earth—under the influence of gravitation—not why it is pulled down by gravity; and so on. If this is true, then it follows that science is not concerned with technological developments.

We offer these observations on theory and practice with no more object than to see the right place attributed to each. In the workshop it is technology that is required, and the student who offers his services to the works on the ground that he is strong in theory is not likely to find a vacancy. One or two men with that qualification will satisfy the demands of a large area, but there is always scope for the man who can apply science for the use and benefit of his employer, and, after him, of men in general. Science and theory, on the other hand, are required to establish on a firm basis the laws used in technology.

It is proposed to expend $2,250,000 on good roads in the neighborhood of Vancouver. Mayor Baxter, of that city, recently expressed the opinion that the provincial government should be asked for assistance.

CALGARY

¶ In 1892 a post of the Royal Northwest Mounted Police; in 1902 a raw "cow-town"; in 1912 a flourishing city: this, in a few words, is the history of Calgary:—a city whose development in a single decade has been so great that in the constructional records of Canada last year it ranked third—above Montreal and Vancouver, and surpassed only by Toronto and Winnipeg. For many years Calgary was "on the map" merely because of the presence of a large detachment of "red-coats," but it has forged to the front so rapidly of late that to-day it stands as one of the great marvels of the Canadian Northwest. The phenomenal expansion of the "cow-town" is accorded special mention in this issue: municipal work is featured in its several branches; the more noteworthy constructional undertakings are described and pictured, and mention is made of those more prominently identified with the upbuilding of the city.

A glance at any statistics on the growth of the city is enough to indicate Calgary's phenomenal expansion during recent years. The greater part of its visible progress has been in the buildings constructed, and so the most interesting figures will be those of the returns from the permits issued for building construction. In 1904 the value of permits issued for buildings was $880,193; in 1907, $2,094,264; in 1908, $837,100; in 1909, $2,420,450; in 1910, $5,589,594; in 1911, $12,907,658; in 1912, $20,394,220. The figures show a remarkable increase from 1908. Last year Calgary ranked third in all the Dominion for the value of permits issued.

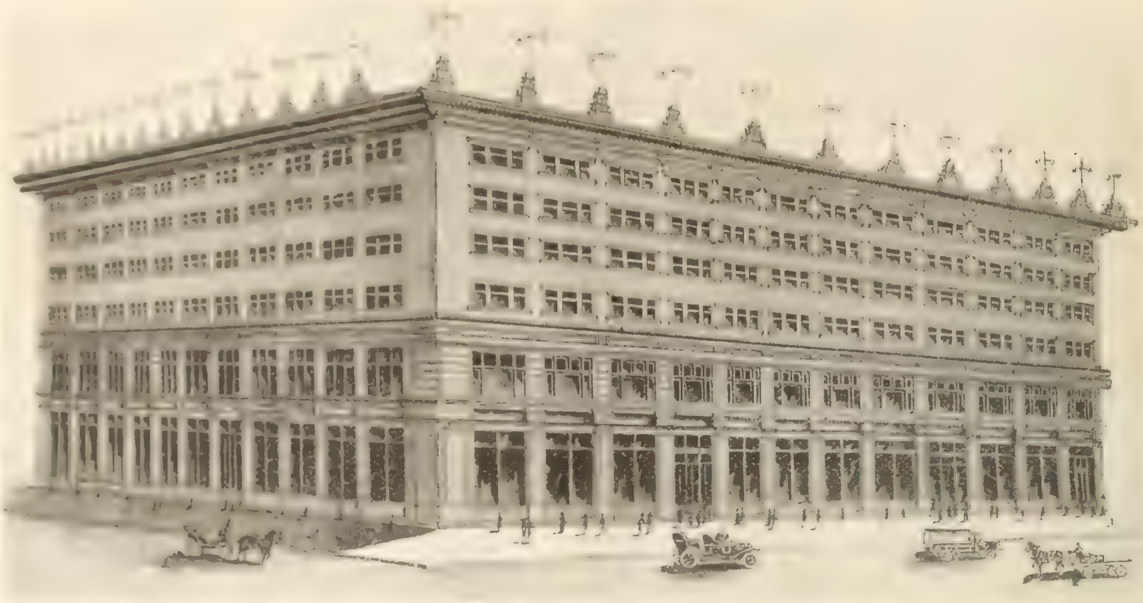
Nineteen hundred and twelve was an exceedingly busy year. Anyone visiting the city in 1909 and again at the present time would be struck at the manner in which the heart of the city has been built up during the past three years. While the figures for building construction may indicate an abnormal expansion of the city, the phenomenal growth cannot be appreciated without a visit to Calgary. Those of us who live here are amazed at the rapid changes in the appearance of the city, so rapid is the growth. Nineteen hundred and eleven closed with several large buildings barely commenced. Among these were the new hotel for the C. P. R., and the new Hudson's Bay store, the estimated cost of each being $1,500,000. And now, at the end of one year, the hotel has been closed in, while the Hudson's Bay store may be opened during the coming summer. The large shops for the Canadian Pacific Railway in East Calgary were completed in 1912. This work involved an expenditure of some three million dollars. So that it may be said that the figures given out for last year represent the volume of actual construction in the city.

An examination of the figures for the year afford an interesting study. One hundred and nine business buildings, aggregating $4,402,920, and 52 warehouses valued at $2,271,200; do not these convey evidence of business and industrial growth? Twelve schools, 12 churches, 1 hospital, 4 theatres, 4 public garages, 4 firehalls; all of these are an indication of the city's general expansion. While 2,173 small houses, 243 houses costing over $4,000, as well as 44 apartment houses, hotels, etc., aggregating in all almost $8,000,000, are a measure of the [illegible] in permanent population.

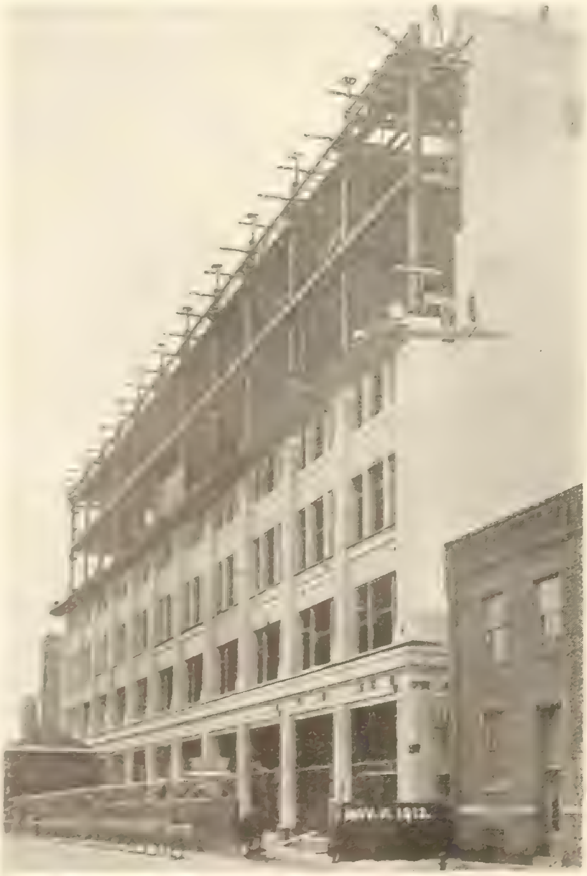
In proportion as the value of building operations have increased, the city building by-laws have been revised from time to time to meet the conditions of congested growth, until now the ordinances are most complete and up-to-date. There are regular fire limits outlined, so that the type of construction varies according as the limits are relaxed. There has been a tendency in the ordinances recently adopted to so increase the requirements for all classes of structures as to eliminate much of the danger that comes from fire, no matter how isolated the building may be. The town planning idea is also much in evidence in these ordinances, as are the latest ideas of sanitary science—so that the owners and operators are being forced by a paternal city to build for the future as well as the present generation. Much of the by-law is due to the influence of Mr. H. A. Sylvester, Superintendent of the Department of Buildings for the city. Mr. Sylvester has started the movement now under way in Western Canada to secure the adoption of a uniform building ordinance which will be applicable to all towns and cities alike. Those who have done contracting or building throughout the west will appreciate the fact that such an ordinance would eliminate much of the inconvenience and possible errors due to the many differences to be found in the by-laws of cities not very far apart.

At present, Calgary, according to the most conservative estimates, has a population of close to 70,000, and bids fair to reach the 100,000 mark before many years. To the casual visitor there is not a great deal to account for the prosperity and growth of this prairie city, but an investigation of the enormous deposits of mineral wealth in the vicinity; the rich farming country to the south and east; the strategic position with relation to the railroads which would enter the north country from the United States- all this and more leads one to believe in a great future for Calgary.

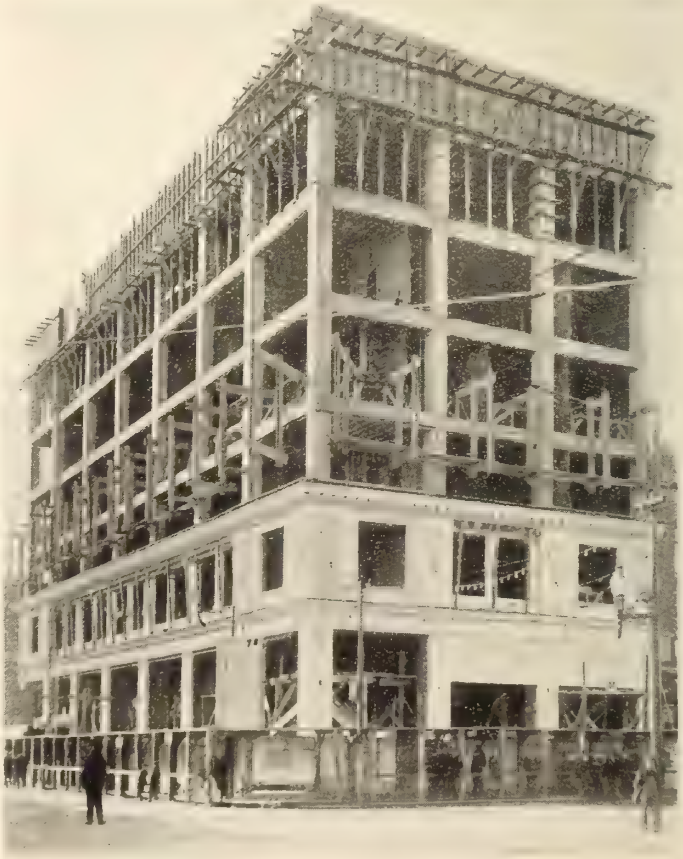
At present one of the most promising, and at the same time one of the best developed of the natural resources in the vicinity are the vast clay deposits which lie throughout the district. There are two large mills of the Canada Cement Company, Limited, in the district, and this year there are in operation from five to seven large brick manufacturing plants, all owned or controlled by local capitalists. The influence of these industries is marked, especially in the many buildings lately constructed in the city. With few exceptions the largest and the smallest buildings make use of the many varieties of brick manufactured local



Architect's perspective of the Hudson's Bay Company's departmental store, for which the Carter-Halls-Aldinger Company, Limited, are the contractors. The estimated cost of the building is $1,500,000.



Constructional view of the Hudson's Bay Store, Calgary, taken Nov. 11, 1912.



Burns Building under construction, Sept., 1912. Architects, Messrs. Hodgson, Bates, and Beattie, Calgary.

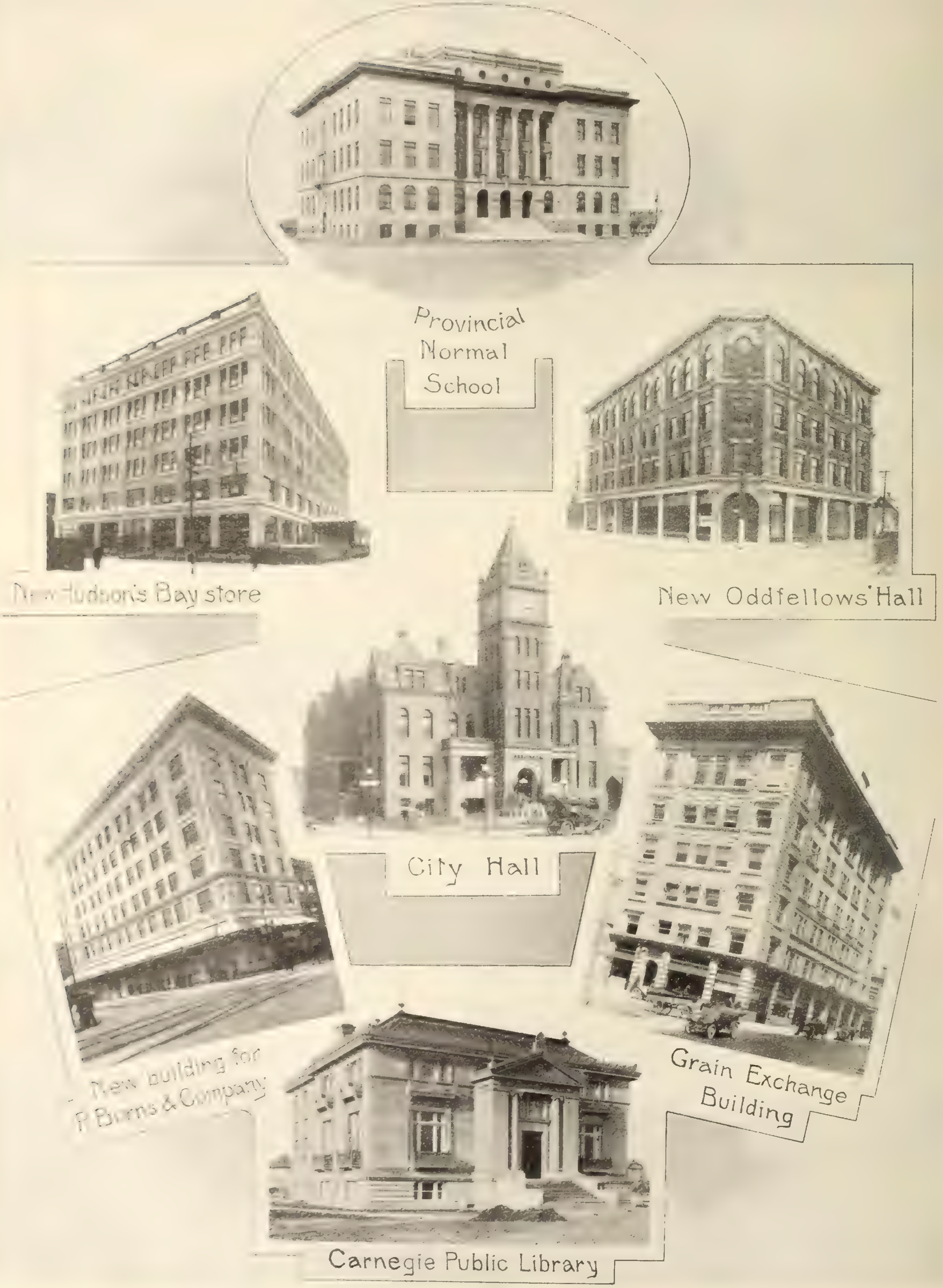
Reinforced concrete elevator under construction at Calgary for the Canada Malting Company.

ly, and are a monument to the development of an important industry. Besides the brick manufacturing industry, there is marked evidence of the fine quarries of sandstone operated in the immediate vicinity. The large volume of building under way in this district has been the means of encouraging the establishment of many large industries connected with the manufacture of building materials, and the presence of an abundance of cheap power—hydraulic, steam coal, and natural gas—has been an added influence. Only the high cost of labor has restrained the manufacturing industries.

Canada Malting Company's plant at Calgary under construction. At the stage shown the elevator building was practically completed and good progress was being made on the malting house. Contractors, Canadian Stewart Company, Limited.

Labor conditions in the city remain vary stable for much of the time, for an abundance of work keeps all too busy to complain of or to encourage differences. The indications are that there may be some unrest during the coming year, as several of the trades are asking for increased wages. Of these demands, perhaps the most important is that of the bricklayers and stonemasons, since they will affect the clay products industry to a large extent. The dispute between this union and that of the stonecutters', as to who shall have the cutting of rough "shoddy," is still unsettled, and the contractors in general have notified the union that no demands for increased wags will be considered until the entire disagreement is adjusted and settled. The bricklayers demand 75 cents an hour; the structural steel workers 62½ cents an hour, and the sheet metal workers, 50 cents an hour. Other demands are to be expected.

Tregillus Clay Products Company's plant, near Calgary.



Provincial Normal School

New Hudson's Bay store

New Oddfellows' Hall

City Hall

New building for P Burns & Company

Grain Exchange Building

Carnegie Public Library

REPRESENTATIVE PUBLIC AND COMMERCIAL BUILDINGS OF THE CITY OF CALGARY.

The Hammond Apartment House, Calgary, as it will appear on completion. Architects, Messrs. Hubbell, Kelly Co., Ltd. Estimated cost, $200,000.

It is hard to predict for the coming season—although there is a sense of security that the building operations for the year 1913 will not fall short of 1912. There is every indication that the increased development of the surrounding country will be reflected in an added growth of the city of Calgary. All are agreed that there will be much expansion in every natural resource of the province, and as much of the capital in these resources is held or controlled in the city of Calgary, there is nothing to fear, and everything to hope for.

Method of Locking Sewer Manhole Covers

By E. W. Robinson, City Engineer, Webb City, Mo.

APPROXIMATELY $200 was expended in Webb City, Mo., during the year 1912 in cleaning out and relieving stoppages in sanitary sewers that were caused through no fault of the design or method of constructing the system. All of the sanitary sewers are of clay pipe from 8 to 15 ins. in diameter, and, with one or two exceptions, the interior presents a straight smooth bore, both as to line and grade. The grade is rarely less than one-half of one per cent. While there has been some trouble from improper materials entering the sewer through faulty house connections, most of the stoppages have been caused by people removing the lids of the manholes and throwing in rocks, sticks, rags and various other articles they wished to get rid of with little trouble.

This has been easily remedied in the populated part of town, for the manholes can be lowered below the surrounding grade of the street or alley, either by removing one of two rings of brick or by filling the surrounding surface with earth or rock and thus obliterating all trace of the location of the manhole. This method has the disadvantage of making more trouble and work for the city employes in getting access to the manholes for flushing and inspection purposes, but is about the only practical way to eliminate such practices entirely.

But in the case of the outfall sewers, which follow the natural drainage courses, there are many places where it is not expedient to place the tops of the manholes below the ground surface. In some places the sewer is so near the surface of the ground that the manholes have to be built above the ground to give room inside for a man to work in case the sewer becomes stopped from any cause. Then again in many places the tops of the manholes have to extend above the surface several feet to keep flood waters from entering through the ventilation holes in the lid. It is in these places that boys seem to take a delight in taking off the lids and filling the manholes full of whatever is handy, usually boulders about the size of a man's head being used. In case some one has dumped a load of trash within a quarter of a mile of the place of operation, the next time the sewer is cleaned one is apt to find various sized pails, pans, etc., stuffed into the pipe. Such obstacles can be removed only by means of sewer rods or by digging up the pipe at the point of stoppage. On one occasion nearly two wagon loads of boulders and rubbish of every sort were taken out of one manhole and the 300 ft. of pipe immediately below it.

On some of the earlier sewers constructed in this city the manhole lids were fitted with iron locks on the underneath side, but they rusted so quickly and so badly that it soon became necessary to break them to get the lid off, and the only alternative was to devise some other scheme to fasten them on. The writer finally hit upon the method shown by the accompanying figure, and it does very well where the lids have to be lifted 2 ins. or more vertically before they can be slid off of the main casting. As shown in the sketch it consists simply of two hasps meeting at the center of the cover, one having a slot which fits over a staple in the other, and fastened with an all brass padlock. On manhole covers where it is only necessary to raise one side of the lid an inch or less to be able to slide it off it would not do the work, and three or four hasps would be demanded for the reason that it is practically impossible to make them fit the top of the cover snugly.

The work of making the hasps, bolts and drilling the castings was done by a local machine shop. The fastening devices were put on the monholes complete, including an all brass padlock for each, at a total cost of $2 each.—Engineering and Contracting.

An ice-breaking car ferry to connect Prince Edward Island with the mainland is to be built, by the Dominion Government, as soon as practicable. Under prevailing conditions no merchandise can leave the island for a rail journey without being transhipped from the island railway to a steamer, and from the steamer to a railway in Nova Scotia or New Brunswick. This is both a costly and slow process. Moreover, the limited storage space and the uncertainty which sometimes characterises the sailings of the winter mail and passenger steamers have prohibited the disposal of produce at the season of the year when prices are best. With the car ferry in operation, it will be possible to load produce on the island into cars that can go straight through to Boston, Montreal or Halifax. It will also be possible to hold produce upon the island until such time in winter or early spring as may be desirable and still be able to guarantee its delivery at a specified time. The project as at present planned is in substitution for a railway tunnel under the straits, which had long been looked forward to by the island.

The New Brunswick Good Roads Association held a very successful meeting at St. John, N.B., recently. Representatives from nearly every county in the province attended.

Road Work in the Province of Alberta

Promising Field of Activity that has been Hampered in Recent Years by Railroad Extensions Main Highway Over Four Hundred Miles Long

THE Provincial Department of Public Works of the Province of Alberta, of which Mr. Chas. R. Mitchell is the head, expended $1,400,000 in improving permanent trunk roads and feeders, and in the construction of steel and wooden bridges in the province during 1912.

According to a statement recently made by Mr. Mitchell at Edmonton, the work of improving highways will be further extended during 1913 in order to meet the needs of the settlers in the newly opened agricultural districts and others making use of the public highways.

The trunk system planned by the provincial government embraces two classes of roads. The first includes the main arterial highways connecting two or more important cities or towns and the second, the feeders, leading from market towns, division terminals and other railroad points to the main highways. The principal main highway is 420 miles long and connects Athabasca in the north with Macleod in the south by way of Edmonton and Calgary. The most important feeder is 100 miles in length and runs from Paddle River to Edmonton via the Lake Ste. Anne district.

The existing trunk roads which are either nearly or entirely completed are as follows: Edson to Grand Prairie; Athabasca to Cardston by way of Edmonton, Calgary and Macleod; Edmonton to Lloydminster on the Alberta-Saskatchewan boundary, following the general course of the Canadian Northern Railway and connecting with the important points on the railway; Edmonton to Wainwright by way of Cooking Lake and Tofield; Wetaskiwin to Camrose and Tofield; Lethbridge to Taber (to be continued to Medicine Hat); Calgary to Medicine Hat and Gleichen; Macleod to the summit of Crow's Nest Pass; Macleod to Lethbridge; Calgary to Banff; Medicine Hat to Walsh; Medicine Hat south to the International boundary.

These roads have been graded and resurfaced where resurfacing was required and where the necessary material was obtainable. The culverts are of timber and corrugated iron, and bridges are of steel and wood, steel being used where the length of the structure exceeds fifty feet.

In some cases the relocation of existing routes was found necessary in order to establish the most advantageous line of travel. In making locations, attention has been given to relative population, soil and climatic conditions and to prospective settlement following the opening of new territories.

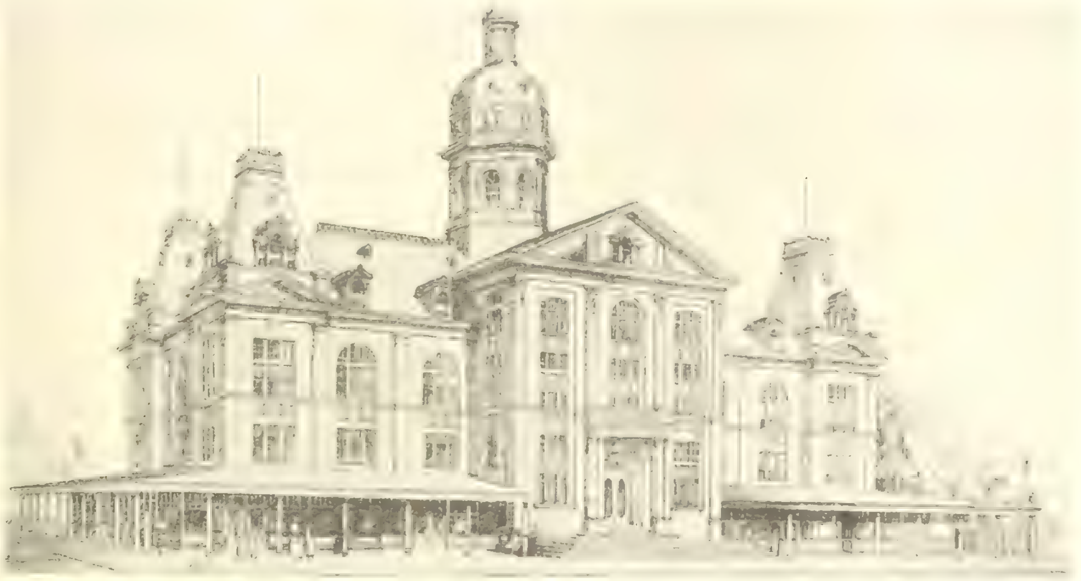
The work of establishing new highways to the best advantage has been considerably hindered by the activity in railroad construction in the province during the past few years. In many cases a branch railroad line has been built opening up new settlements a considerable distance from any highway, sometimes changing the trend of traffic and public travel from east and west to north and south and vice versa. This has not only complicated the work and entailed an additional amount of road construction, but it has also been the cause of the expenditure of large amounts of money in the alteration of road systems which were entirely adequate before the advent of the new railroads.

The construction of trunk roads and the more important road and bridge work is under the jurisdiction of the provincial government by authority of the "Rural Municipal Act," which is now in operation in over sixty localities. The cost of construction is, therefore, paid out of the appropriation made for provincial public works expenditures. The department had at its disposal during the year 1912 a total of $1,500,000. This sum was derived from the annual subsidy for roads and bridges which amounts to $400,000, the $1,000,000 appropriated at the last session of the Provincial Parliament and chargeable to capital account, and the annual appropriation of $100,000 derived from revenue.

Experiments with Gas Producer Plant

The results of a series of experiments conducted during 1910 and 1911 at the Fuel Testing Station, Ottawa, with a gas producer plant, designed for use with peat fuel, are given in a report by Mr. B. F. Haanel, B.Sc., the chief of the Fuel Testing Division, recently issued by the Department of Mines at Ottawa. A summary of the results of the investigation are as follows:—The peat producer gas power plant, as now constructed, may be pronounced thoroughly reliable. Its operation may be carried on continuously for a week or more without having to shut down for the purpose of cleaning the valves of the engine. The engine has been operated for a period of 150 hours without removing either the admission or mixing valves for cleaning. It should not be found necessary in commercial practice to remove the piston for the purpose of cleaning more than once in six months. The operation of the producer is uniform, and the gas delivered to the engine varies only slightly during a ten-hours run. The removal of ashes and the cleaning of the fires can be done without interfering with the operation of the engine, due to a change in the quality of the gas. The plant can safely be left in the hands of an intelligent labourer. It is recommended that the gas pipes leading from the producer to the cleaning system and the tar filter be cleaned once a week if possible when the plant is run ten hours a day during the working days of the year.

In connection with municipal development at Calgary, a statement of the work completed to December 31st, 1912, is of considerable interest. Last year the city laid 40.8 miles of concrete walk as against 20 miles in 1911, and 8 miles in 1910. The paving work represented 21 miles, as compared with 12 miles in 1911, and 4 miles in 1910. The sewer construction totalled 54.57 miles, as against 33.10 miles in 1911, and 24.93 miles in 1910. The water mains laid in 1912 were over 47 miles—nearly three times the quantity laid in 1910. Altogether the city has 115.80 miles of concrete walk; 45 miles of paved streets; 156.20 miles of sewers, and 154.82 miles of water mains, with 13 miles of gravity.



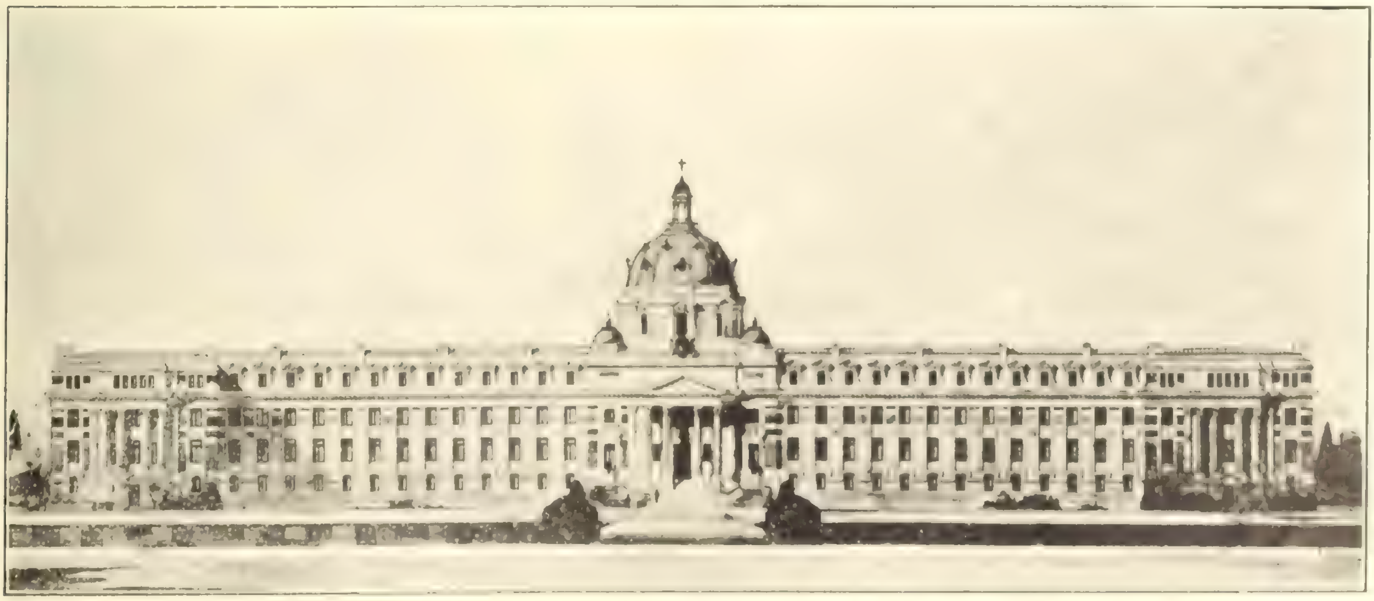
Proposed Public Market, Maisonneuve, Que.

Maisonneuve Public Market

THE city of Maisonneuve, P.Q., is constructing a public market from plans by Mr. Marcus Dufresne. The building consists of three-storeys, with a basement, and a central dome 125 feet high. The area of the site is 154 feet by 86 feet. The structure will be in the French style of architecture with a Doric portico. The foundations are of reinforced concrete, the base of granite, and the exterior pressed brick, the roof being of Spanish tile. The ground floor will be tiled, and the walls constructed of marble. About 20 butchers' shops are to be located in this part of the building, each having its own refrigerator, and in addition there will be 30 retail stores. Over these are offices, comprising the first-storey. The second storey will be used as a public hall, supplied with tables for the display of farmers' produce, while the third storey will be used for storage purposes. The work is to be done by day labour.

Proposed R. C. Seminary, St. Johns, Que.

THE illustration shows a proposed junior Roman Catholic Seminary to be built at St. Johns, P.Q., to replace a similar institution destroyed some time ago at Maryville, P.Q. The structure, designed by Mr. L. J. T. Decary, architect, New Birks Building, Montreal, will consist of five storeys, and will be used for the training of priests. The frame will be of reinforced concrete, with an exterior of brick and cut stone, while glazed terra cotta will be employed on the inside work. The chapel is to be of Caen stone. The roof will be of felt and gravel. The approximate cost is $1,500,000, and work will be commenced in the spring.



Proposed R. C. Seminary, St. Johns, Que. Architect, Mr. L. J. T. Decary, Montreal.

Problems of Water Supply and Sewerage—1

Requirements of a Satisfactory Supply Outlined in the First of a Special Series of Articles Written Expressly for The Contract Record

By W. Muir Edwards, M.Sc., C.E., Professor of Civil and Municipal Engineering in the University of Alberta

I[illegible] that in very ancient times [illegible] have been issued, the [illegible] very well have considered that an [illegible] Water and Sewerage problems would be of value to the community. It is of even greater interest to note that in spite of the immense advance of science many of the regulations regarding sanitary procedure in the old Jewish [illegible] used by the Romans in their water supply undertakings, are fundamentally correct and approved of at the present day. In fact the excavations in Crete have pushed back the period of high civilization so far that we now know that a very creditable sewerage system flushed by water collected on the roofs, was installed in the palace of Knossos, 2000 B.C., and that in Hagia Triada there is a sewerage system which was in use 4000 years ago and still satisfactorily performs its duty of carrying off the storm water.

So far as we know, however, there has been an immense advance in a knowledge of why certain requirements must be met. As an illustration might be cited the case in recent times of the slow sand filters of London which were condemned when chemical analysis only was the means used in determining the efficiency of the process, but which by the later bacterial theory were amply justified. Thus the whole subject is becoming more and more open to exact scientific treatment. It is nevertheless well to remember that the subject is still in process of development and, while giving due weight and emphasis to those facts which have been fully established, to retain an open mind toward suggested improvements on, or criticisms of present practice.

There are several phases of the subject regarding which there is a field for discussion. On the other hand a great deal of the subject is more or less standard and of common knowledge to those familiar with the science. A treatment of these latter facts, however, should be also of interest and of educational value to the non-professional reader, and it is with this in view that they are included in the present series.

There are several reasons which make a public water supply advisable at a certain stage in the growth of a municipality. In the early days of community life each householder is a unit sufficient unto itself. The water required for its maintenance is obtained by the members thereof either from a private well or by private means from a surface supply. The necessary wastes from the household are also cared for privately, usually by deposition on the land surrounding the dwelling. The area of this land at this period is usually extensive and it is thus quite capable of caring for the waste products and of acting, if required, as a satisfactory collector of the water supply for the family. As the area of this plot of land decreases, as decrease it must if there be civic growth, the problem of community action in regard to these two essentials in maintaining good health, becomes more and more insistent and must ultimately be faced.

The introduction of a public water supply will mean much freer access and therefore a much freer use of water. In some cases it will mean the substitution of a soft for a hard water, which in itself is a boon to the community. There can be a careful scientific oversight and consequent safeguarding of the supply of the whole community. There is also made possible a sewerage system with water carriage as the means of immediate disposal, in fact the public supply means a decrease in the difficulties of the housekeeper that only those can estimate, who, accustomed to a free supply at the turning of a tap, find themselves suddenly deprived of the same. Commercially a public water supply will often justify itself in the added fire protection and consequent reduction of insurance rates.

At what period of its growth a municipality is justified in installing a public supply is a question that can be determined only in each individual case. Were it possible to vary the cost of installation directly with the population to be served it would seem advisable to install a supply as soon as a few hundred people could be served in a restricted area. But as certain fixed charges have to be met in the initial installation, there must be a population and a borrowing power that will justify the town fathers in undertaking a public supply. The extent of this initial cost will vary with the nature of the source. In a pumping proposition it is often possible to cut down the plant to present needs, but even then future efficiency will be affected if the larger installation required later be thus composed of small units added from time to time. The possibility of growth is therefore an important factor and it is a noticeable feature of Western municipalities that agitation for and installation of water and sewerage systems occur at a period of civic growth which would be unthought of in the East. The rapid growth of the municipalities in most cases justifies the foresight, or shall we say the optimism, of their business men. It is, however, a matter for each community to work out for itself, having considered the cost of initial installation, the probable revenue to be derived, and having decided sanely on their probable future growth.

The discussion of the water supply might be undertaken under the following heads: (1) Requirements of Supply; (2) Source of Supply; (3) Delivery of Supply; (4) Operation of System.

REQUIREMENTS OF SUPPLY

1. **Quality**—The quality of a public supply should be considered first in dealing with any suggested source. If the quality is not up to the requirements, considerations of cheapness or quantity should not be allowed to influence the decision. Of course, it is quite possible, as will be pointed out in the discussion of Water Purification, to rectify many, if not all, the objectionable features of the selected source. This treatment should then be considered as part of the problem and the cost of the final product, not that of the raw water, be the factor used in determining the suitability of the supply. The quality of the water naturally comes under three heads, namely, Physical Characteristics, Chemical Composition, and Bacterial Content.

Physical Characteristics—such as color, turbidity, taste, odor and temperature, are usually the basis for the popular judgment of a supply. Although from a purely health point of view they are not of extreme importance, nevertheless, in providing a supply, public opinion as shaped by these characteristics, should always be considered.

Color.—The color of a water is to be distinguished from its turbidity. The former is due to dissolved constituents, while the latter is caused by matter in suspension. Sometimes the color of a water is due to organic contents which are absolutely harmless. This is especially true of rivers which drain swamp lands. The color of the Ottawa River, for instance, is quite marked, but has absolutely no significance as to its being healthy or otherwise as a source of supply. On the other hand, it should be remembered that absence of color is not a guarantee of safety, since a colorless water may contain disease-producing bacteria. We naturally prefer a clear sparkling water, and are entitled to it if it can be obtained without undue cost. On the other hand, the elimination of color from a water may be a very expensive operation, and it should therefore always be borne in mind that color in water is not in itself sufficient to condemn the source.

Turbidity.—This is due, as has been stated, to suspended matter. This is usually inorganic material, but sometimes consists of vegetable growths such as algae, which may occur during the warm summer months. The degree of turbidity caused by a given amount of suspended material will depend upon the nature of the suspended particles. Clayey material will produce a greater degree of turbidity than will an equal amount of sandy particles and is also more difficult to settle out. The correction of turbid conditions in a source is usually a simpler matter than the correction of color, and although the same remarks apply as to its significance from a purely health point of view, nevertheless, the public naturally demand, and are entitled to, a water free from turbidity. Many readers will doubtless testify that their demands in this regard do not receive much consideration. As, however, turbidity is not necessarily harmful, but merely objectionable to the senses, there is something to be said in support of a policy of refusing to provide the necessary purification works should these latter be needed only for two or three weeks each year.

Taste and Odor.—If these occur in a water they are usually due to the growth of algae, a lower form of plant life. Normal waters should be relatively free from any pronounced taste. Distilled water tastes "flat" or insipid because of the absence of dissolved oxygen and CO_2 which gives the pleasant taste to ordinary good water. Dissolved mineral constituents such as iron, sulphur, salt, etc., may also give an objectionable taste to a water.

Temperature.—The temperature of surface supplies varies with the seasons, being just above 32 deg. F. in winter and rising to possibly 80 deg. F. in summer. Lake supplies will not show such a variation, the uniformity depending upon the depth of water in the lake. Underground supplies are much more uniform, varying but slightly from 50 deg. F., which is a satisfactory temperature for a drinking water.

Chemical Composition.—Water is a solvent for many substances. Its power in this respect is increased by heat and by the presence of certain gases such as CO_2 in solution. Many underground waters coming from a deep source of supply have in solution salts of iron, copper, sulphur, etc., and upon cooling deposit these, forming veins and other mineral deposits. Spring water may thus contain in solution substances which have a medicinal value but are objectionable in a public supply. Surface water draining swamp land may carry [illegible] material. As has been pointed out, in many cases this is harmless, but should the organic content [illegible] possibility that the [illegible] water may dissolve lead or zinc from the pipes of the distributing system, thus causing lead poisoning.

The most common chemical constituents in water supplies are, however, salts of the alkaline earths, such as lime or magnesia. These give what is termed "hardness" to the water. The actual effect of these salts in regard to health has not been definitely settled. It is claimed by some that certain diseases [illegible] waters, but there is no scientific confirmation of this belief. On the other hand, the economic objections to a hard water are well established. For domestic use hard water impairs the flavor of many foods cooked therein and is extremely objectionable in the laundry. There is not only the inconvenience in its use, but there is a direct monetary loss in the extra amount of soap required. For commercial purposes the formation of scale, when used for steaming purposes, in many cases prohibits its use altogether.

The Bacterial Content of a water is really the important point when the matter of health only is under consideration. It is in this that the disease-producing organisms may lurk. Bacteria are extremely minute organisms which occur in great numbers in the upper layer of the earth's surface, are present in organic substances and are necessary to most of the biological and chemical actions which occur. They are not always harmful; in fact they are extremely necessary to the processes which contribute to our existence. Certain diseases, however, such as cholera, typhoid, dysentery and kindred ailments, are accompanied and propogated by certain specific bacterial organisms which grow in great numbers in the intestines of those afflicted with the disease and being carried off in the waste products are capable of transmitting the disease should they find their way into the systems of other persons. There is thus always a possibility of disease-producing contamination if sewage containing human excreta is allowed to enter a public water supply. The extent of this danger and its prevention will be dealt with later, mention of its possibility is sufficient at the moment.

There are certain bacteria that are known to be characteristic of domestic sewage. These are not necessarily disease-producing, but their presence indicates the presence of sewage, and is therefore to be taken as an indication of a possible danger. B Coli is the name commonly given to a type that is the best known of such a group and as its characteristics resemble those of the typhoid baccilus it is taken as the "indicator." Its presence in a supply is therefore always a sign of possible danger and such supply should be looked upon with suspicion.

There is a very practical point just here that does not seem to be properly understood by the public. It is seemingly the popular belief that the presence or absence of B Coli may be taken as an absolute rigid test as to the danger from or safety of a supply. Also if an outbreak of typhoid is being investigated and the water supply is under consideration a sample submitted to a bacteriologist, a couple of weeks after the doctor has been required, is expected to settle the responsibility or otherwise of the water supply as the source of infection. In this connection it can not be too strongly pointed out that a positive result, i.e., the presence of B Coli is strong evidence against the supply, but a negative result, i.e., the absence of B Coli, by no means exempts the supply from the charge. It takes from two to three weeks after inoculation for the typhoid to develop in such a way as to require medical attention. Meanwhile the contamination of the water may have entirely ceased, or, if it be at intervals, the sample may have been taken during a period of non-contamination.

Much the better plan to adopt in investigating an outbreak of typhoid is a tabulation of the characteristics of each case, in which such facts as bear on the infection are grouped and analyzed. A test of the water and milk supply is also advisable but only as a supplementary procedure. When, [illegible] three years ago, it is found that the milk supply is varied, that other sources of infection such as flies, etc., are eliminated by the climatic conditions, but that ninety-five per cent of those affected can be shown to be using the public [illegible] tests to locate the seat of the trouble. In this particular [illegible] treatment of the water supply eliminated entirely [illegible] after [illegible] and the municipality has been [illegible] from that time to the present.

As regard to quality, therefore, it is to be remembered that it is not what we see, but tests, that is the deciding factor so far as health only is concerned. The water must be tested chemically and bacteriologically and, equally important, the results must be interpreted by those familiar with the subject and having a full knowledge of all the contributory details of location, occurrence and surrounding [illegible].

Quantity.—The attitude of the ordinary householder toward any restriction in the, as he terms it, "free" use of water is very interesting to anyone engaged in endeavoring to reduce such use to a legitimate amount. In any statements made in this discussion, therefore, it should be clearly understood that the figures given assume the freest possible use of water, but do not provide for unnecessary and useless waste.

Possibly a word of explanation might be useful. Rates of supply are estimated in gallons per capita per day. Thus if the total number of gallons supplied in a year were divided first by 365 and the quotient divided by the total population, we arrive at a figure which gives us the average rate of supply in gallons per capita per day for that year. During certain months of the year the rate of supply will be higher and in other months lower than this average. Likewise on certain days the rate may be higher or lower than the average for the month and during certain hours of each day the rate of supply may vary greatly from the average rate for that day, and even more so from the average rate for the year.

It might be pointed out that in this method of averaging the consumption over the whole population there will be a marked difference in the results arrived at depending upon the percentage of the population using the supply. Other things being equal, a freshly installed supply which has not reached the outlying districts will show a much lower per capita consumption than will an old established system serving the majority of the population.

In comparing statistics in Canada or Great Britain and the United States, it is well to remember that the term "gallon" used in the former is the Imperial gallon (.160 cu. ft.) and in the latter the U. S. gallon (.134 cu. ft.) a working relation being that a U. S. gallon is 5/6 of an imperial gallon. Throughout these articles quantities will be expressed in terms of Imperial gallons.

In estimating the quantity required the consumption of a public supply naturally falls into four classes, e.g., domestic use, commercial use, public use and waste or loss.

Domestic.—Metered supplies show that the use for domestic purposes varies from 5 to 30 gallons per capita per day. Folwell estimates that the use of water in a private dwelling might be classified as follows:

For ordinary indoor use, 12 to 20 gals per capita per day.

For stable use, 40 to 175 gals. for each horse and carriage.

Sprinkling lawns in summer, wasted to prevent freezing in winter, 175 to 1,800 gals. per day for the dryest and coldest months respectively (say four months in each year).

Commercial Use.—This includes that for mechanical, trade and manufacturing purposes. It varies greatly in different localities, but might be put down as from 15 to 35 gallons per capita of the total population.

Public Use includes that for schools and other public utilities, water troughs, fountains, street sprinkling, flushing of sewers and water mains, fire service, etc. It will amount to from 2 to 8 gals. per capita of the total population.

Waste or Loss.—In every system when all the domestic, commercial and public use of water have been combined it will be found that there is a discrepancy between this total and the amount supplied. In some cases this is an excessive amount indicating unnecessary waste. The detection and prevention of this waste will be considered in the discussion on the operation of the distributing system. It is sufficient to say here that a greater loss than 12 to 25 gals. per capita of the total population is not necessary.

We might thus sum up the quantity required for the freest possible legitimate use of water as follows:

Class	Minimum gal. cap. day	Maximum gal. cap. day	Average gal. cap. day
Domestic	5	30	20
Commercial	15	35	25
Public	3	10	5
Loss and waste. .	12	25	20
	—	—	—
	35	100	70

Although many cities have a consumption running much higher than this, 120, 150 and even 200 gals. per capita per day being not unusual, there are other cities in which the supply is almost entirely metered and which have a consumption below the average of 70 gals. per capita per day. For instance, Fall River, Mass., had a consumption in 1910 of 35, Lawrence, Mass., a consumption of 38, and Lowell, Mass., a consumption of 43 gals. per capita per day. Investigation all tends to show that a greater consumption than a 100 gals. per capita means that there is a preventible and useless waste of water.

Pressure.—In many public water supplies the question of the pressure maintained is a cause of much discussion and often of very adverse criticism. For ordinary purposes a street pressure of 25 to 30 lbs. per sq. in. in residential districts and 30 to 35 lbs. per sq. in. in business districts is sufficient. For fire purposes either a hydrant pressure of over 60 pounds for residential and 70 pounds for business districts should be supplied or if steam fire engines are used the hydrant pressure may be allowed to fall even below the domestic pressure, the requirement being that sufficient water is supplied so that the pumps will not work on suction. Since the relative elevations of different parts of a system bear directly on the pressure it is to be understood that the pressures stated are available at the higher points. When this is true it is quite possible that other parts of the system would be under higher pressures. The design of the system should be such, however, that unless special provision be made in the distributing system higher pressures than 135 pounds will not occur. A more detailed discussion of the subject will be taken up when considering the distributing system.

Briefly, the requirements of supply are that the water should be pleasant to our senses, should satisfy the chemical and bacterial standards of purity, should be delivered at an average rate of from 70 to 100 gallons per capita per day, provisions being made for much higher rates for short periods of time, and that a street pressure for ordinary purposes of from 25 to 30 and for fire protection of from 70 to 100 pounds per sq. in. should be maintained.

(To be continued)

Further important buildings are projected in Montreal. Among these is a ten-storey hotel, to be erected at the southeast corner of St. Catherine street and McGill College avenue. The plans provide for a subway in the basement, giving a connection with the C.N.R. tunnel station. The property has a frontage on St. Catherine street of 106 feet; 108 feet on Cathcart street, and 196 feet on McGill College avenue, making the total area 22,000 square feet. The cost, including the land, will be about $3,000,000. Another skyscraper is to be constructed in the down-town section, at the corner of St. Peter and St. Paul streets and Youville square. The preliminary plans, prepared by Mr. Dan Creighton, Montreal, show a building of ten storeys, constructed on the mushroom principle. The floors will be each 120 by 32 feet and the two or three upper ones will be at first rented for light manufacturing purposes until Messrs. McComber and Cummings, the proprietors, require the whole of the available space. Fashion Crafts, Limited, will erect an eight-storey factory on St. Dominique, Demontigny and Cadieux streets, the area being 30,000 square feet.

Professor W. Muir Edwards

Whose Series on Water and Sewerage Problems Commences in This Number

Professor W. Muir Edwards, M.Sc., C.E., of the Department of Civil and Municipal Engineering of the University of Alberta, is the author of a series of articles on water and sewerage problems inaugurated in this issue. Mr. Edwards was born in Montreal, in 1879. Shortly afterwards his parents migrated to the West, living at Indian Head and Qu'Appelle Station from 1885 to 1889. Later he returned to Ottawa where he entered the public school and afterwards the collegiate institute. He was enrolled at McGill University in 1897 and graduated in mining and engineering in 1901 and in civil engineering in 1903, taking the degree of M.Sc. in 1902. After graduation his first engagement was with the late Mr. Cecil B. Smith, at Niagara, after which he became identified with C.P.R. irrigation work near Calgary.

In the fall of 1903, Mr. Edwards was appointed Lecturer in Mathematics and Municipal Engineering at McGill University, succeeding Mr. R. S. Lea, now consulting engineer of Montreal. In 1905 he became Assistant Professor of Civil Engineering at McGill, a post which he gave up in 1907 to become Assistant Professor of [illegible] and Mathematics in the newly-formed University of Alberta. He was appointed to his present office of Professor of Civil and Municipal Engineering in 1908.

Professor W. Muir Edwards

During the summer months of his student years Professor Edwards gained extended experience in various departments of engineering work, while since graduation he has been identified with many important enterprises during the vacation period. The operations of the Niagara Power Company, with which he was connected, added considerably to his experience, as did also his work for the Canadian Pacific Railway in the irrigation field near Calgary. Exemplifying Professor Edward's enthusiasm for gaining experience, he spent one summer in the designing office of the sewer department of the city of Philadelphia studying the methods employed and taking part in the inspection of work on a large filtration plant at Torresdale.

Mr. Edwards' work in the railroad and mining field would be well worth a good sized paragraph, but his connection with the municipal field is of paramount importance to this journal. One of Professor Edwards' important engagements was with the city of Ottawa on the design of special structures, and of a sewerage system for Ottawa South. His activities at Ottawa included charge of water waste inspection and prevention, and the preparation of a report on sewage disposal for the Water and Sewerage Commission.

While he has been in Western Canada, Professor Edwards has been identified with many important operations and has reported on proposed water supplies and power developments for a number of Albertan towns. The installation of sterilization plants for a number of water supply systems has been carried out under his supervision.

Personal Mention

Mr. R. W. Lines was appointed president of the Alberta Architects' Association at the recent annual convention of that body at Edmonton.

The new City Engineer of Calgary, Alta., is Mr. Geo. Craig, formerly Assistant City Engineer of Omaha, Neb. The Calgary post is worth $5,000 a year.

Mr. W. W. Hay, Secretary of the Calgary Builders' Exchange, has resigned to engage in business with Mr. R. A. Brocklebank, president of the Exchange. Mr. Hay's resignation goes into effect on February 22nd.

Mr. R. R. Knight, chief designing engineer of the sewer department of the city of Toronto, has been appointed city engineer of Fort William, Ont. Mr. Knight hails from England where he had considerable experience in the municipal engineering field.

At Montreal, recently, there passed away a well-known contractor in the person of Mr. Geo. Bowie. A native of Montreal, in which city he was born seventy years ago, Mr. Bowie was actively engaged in contracting until 1907. He erected several of the city's older buildings and had an intimate knowledge of all branches of the trade. Several years ago he was an unsuccessful contestant for parliamentary honors.

Mr. F. C. Gamble, the newly elected vice-president of the Canadian Society of Civil Engineers, is a native of Toronto. His professional experience has been mostly in the field of railroad construction. In 1911 he was appointed Chief Engineer of Railways for British Columbia. In addition to his membership in the Canadian body he is also a member of the Institute of Civil Engineers and of the American Society of Civil Engineers.

Mr. George D. Smith, general superintendent of the Canada Steel Foundries, Limited, died suddenly in his apartments at the Windsor Hotel, Montreal. He suffered from heart trouble for two years. Mr. Smith, who was born in Montreal forty-eight years ago, was early connected with the Canadian Pacific Railway, afterwards joining the Canada Switch Manufacturing Company, which was later changed to the Montreal Steel Works. The concern was purchased by the Canada Steel Foundries, Limited, of which Mr. Smith became general superintendent.

The city of London, Ont., has decided to place the waterworks department under the control of the city council, the change to take place on December 31 next.

Amalgamated Contracting Interests at Calgary

THE recent amalgamation of the two firms of Fyshe, Martin & Company, Limited, and of McNeill & Trainer, Limited, general contractors, gives promise of success to be one of the largest firms of building contractors and engineers west of Winnipeg. Capitalized at $300,000, the firm has at present under way contracts aggregating over $2,000,000.

[illegible] Thos. M. Fyshe is well known in engineering circles from Montreal to Vancouver and is one of much weight in many large corporations in the city of Calgary. The others are equally well known throughout the Dominion for their achievements in contracting.

Canada Life Building, Calgary, in course of erection.

Messrs. Fyshe & Martin are both graduates in engineering of McGill University. The former is the financial genius of the firm, while the latter has under his supervision the large office force necessary to the business. Mr. Jas. A. H. McNeill is well known in Western Canada and will devote his time largely to the progress of actual construction. Mr. David Trainer, formerly of Carter-Halls-Aldinger, Limited, of Winnipeg, will attend to the purchasing of all materials.

Among the firm's contracts completed recently or now under way are the new Lougheed Building, the Sherman Grand Theatre, the buildings for the Canada Life Assurance Company, Limited, Herald Publishing Company, Limited, and Calgary Furniture Stores, Limited, the new $70,000 Knox Presbyterian Church, warehouses for the Calgary Paint & Glass Company, Limited, and the Northern Electric & Manufacturing Company, Limited, all in Calgary, besides the new $150,000 waterworks for the city of Medicine Hat, and two six-storey, mill construction warehouses in Edmonton for Teese & Perse Limited, and for Metals Limited, of Calgary, besides other smaller contracts.

Canada Life Building, Calgary

The new building for the Canada Life Assurance Company, Limited, at the corner of Eighth avenue and Second street west will be six storeys above the basement. It will be 80 feet by 75 feet in plan, and will be 88 ft. 6 ins. high above the street grade. The structure is now well under way, and has a structural steel frame, fireproofed with concrete, with combination tile-and-concrete floor slabs. The Dominion Bridge Company, Limited, furnished and erected the 240 tons of steel required on the street facades. The building will have a terra cotta and ornamental iron exterior, the inside exterior walls being of buff face brick. The entire ground floor, 24 ft. 6 ins. high, will be occupied by the owners, and will be finished in panelled mahogany and ornamental iron and marble. The entire second floor will be devoted to the offices of Toole, Peete & Company, Limited, of Calgary, the Alberta agents of the parent company. Above there will be four floors of office suites, finished in quartered oak, with hardwood floors, the corridor floors being terrazzo. The partitions will be of plastered terra cotta and glass. Two passenger elevators will serve the building. The estimated cost is $325,000. The architects are Messrs. Brown & Vallance, of Montreal.

The Lougheed Building, Calgary

McNeill & Trainer, Limited, have just completed the construction of the office building and theatre for Senator James A. Lougheed, the most up-to-date building in the city. In plan the building has an entrance frontage on First street west of 130 feet, and extends for 200 feet along Seventh Avenue, being six storeys above the basement. The exterior is of red face brick with Calgary sandstone trimmings. In the southeast corner of the block is the new Sherman Grand Theatre, completed over a year ago, before the main building was commenced. The theatre is decorated inside in the Roccoco style, and has the largest stage in western Canada, 45 feet deep and 82 feet long for the full height of the six storeys. There is but a single balcony, rising in two tiers, the lower tier being a canti-lever balcony supported by four cast iron columns. The facilities for theatrical companies are very complete and the seating is 1,604. The theatre is heated and ventilated by blower systems. A complete vacuum cleaning system is installed.

Lougheed Building and Sherman Grand Theatre, Calgary.

The foundations for the structure are concrete walls resting on footings in the compacted strata of gravel which underlies the entire city and so simplifies the problem of foundations. The frame is structural steel, with cast iron column bases, the Dominion Bridge Company, Limited, supplying and erecting in all 485 tons of steel. The framing is the simplest "steel cage" type except for the theatre, which presented but few problems of difficult design. The framework is all protected by concrete and the floors are all solid reinforced concrete slabs throughout. All partitions are of terra cotta, furnished by the Alberta Clay Products Company, Limited, of Medicine Hat. The ground floor is divided into stores, all finished to suit the tenant. In the basement is Kronn's Restaurant, very elegantly, though simply fitted with panelled golden oak, and with beamed and groyned plastered ceilings. There are three office floors above the ground floor, with terra cotta and glass partitions, trimmed with white birch, every room having an outside window. Above these floors are two floors devoted entirely to 2 and 3-room bachelor suites, all finished with mahogany, having a bathroom to each suite. The baths are small, but they are excellently planned, and have tile floors and wainscoting. Except for the upper living floors, the corridors throughout the building have terrazzo floors, with marble wainscoting five feet high. Two Otis-Fensom passenger elevators serve the building for twenty-four hours of the day, and, in addition, there is a service elevator next the alley-way. The building is heated throughout by steam. The plumbing and heating installation was made by H. Kelly & Company, Limited, of Calgary; the electrical work by the Gracey-Crane Electric Company, Limited, of Calgary; the plastering by the J. A. H. Lake Estate, of Calgary; the hardwood trim was furnished by Emil Carlson, of Minneapolis. All the brick used were supplied by the Canada Cement Company, Limited, from their local plant. The architect was Mr. L. R. Wardrop, of Calgary and Salt Lake City. The cost of the office building and theatre complete was about $650,000.

(Concluded in next issue)

Good progress is being made on the construction of the new terminal pier at Halifax, N.S. 1,818 reinforced concrete piles are necessary for the erection of this pier, and these piles, which weigh from eleven to twenty-three tons each, are driven into the solid sea bottom by means of a sixteen ton steel hammer, which strikes eighty blows a minute. The new pier, when completed, will be 700 feet long and [illegible] feet wide.

The Steel Corporation late in 1912 announced its intention of building an iron and steel manufacturing plant in Canada, the location of which will be not far from Detroit, and at a point where it can receive raw materials and ship finished products by water as well as by rail. No details have yet been published with regard to this plant, but it is reported that work will be begun early in 1913. The site has already been purchased.

Engineers' Club of Toronto—Annual Meeting

THE annual meeting of the Engineers' Club of Toronto was held at headquarters, 90-96 King street west, on the evening of February 6, with the President, Mr. Willis Chipman, in the chair. The minutes of the last annual meeting were read by the secretary, Mr. R. B. Wolsley, and the annual report of the Board of Directors was presented. The report was a tribute to the efficient administration and painstaking work of the executive, which later received warm recognition. It was pointed out and generally conceded that the office of Club Director was no sinecure, and that the enthusiastic response that had been made by the officer of the Club to the many and exacting calls for unselfish and inglorious work was worthy the highest encomium.

The membership of the Club has now increased to 459, and there is a great field of usefulness ahead—as was shown by Mr. Chipman, who gave some interesting figures relating to the local strength of the engineering and allied professions. With further development in view, the Club is considering the matter of new club quarters. During the past year, alterations have been effected at the King street premises which have greatly improved the accommodation there, but it is felt that in spite of these welcome improvements [illegible] by the directorate, the quarters are altogether inadequate to meet the growing requirements of the Club. The matter was introduced at the meeting by Mr. W. A. Bucke, and there was considerable discussion as to various methods of financing the undertaking. The special building committee, of which Mr. Bucke is chairman, is prosecuting active enquiries.

Mr. Willis Chipman, Toronto

A schedule of amendments [illegible] of by-laws [illegible] drawn up by the Board of Directors, received the approval of the meeting.

In accordance with the by-law by which five directors retire annually, the following were elected [illegible] on the directorate: Messrs. Eustace G. Bird, E. T. J. Brandon, Willis Chipman, W. F. Ferrier and James Milne.

The proceedings were brought to a close with a few remarks from Mr. Chipman in response to a vote of thanks that had been accorded him. The retiring president expressed the intention of continuing to serve the Club on the directorate to the best of his ability. A point that received particular emphasis by Mr. Chipman was the desirability of building up the technical work of the Club. Mr. Chipman reminded those present that the percentage of non-technical to technical members was only 17, and that in developing social facilities they should not lose sight of the fact that the acquisition of professional knowledge was one of their main objects. In an era of prosperity like the present there was a rather regrettable tendency to commercialize engineering — to think more of the material side than the technical. Doubtless in course of time an adjustment would come aboat nataraliy. He believed that the greatest advances in engineering [illegible] in times of adversity.

A meeting of the directors will be held shortly for the purpose of electing a new president and three vice-presidents. The directorate of the Club is now comprised of the following gentlemen: Messrs. W. A. Bucke, Edmund Burke, E. G. Bird, E. T. J. Brandon, Willis Chipman, E. L. Cousins, W. E. Douglas, W. F. Ferrier, C. H. Heys, Jas. [illegible] McAllister, Jas. Milne, G. G. Powell, T. S. Young, and Col. A. J. VanNostrand.

The Warren Bituminous Paving Company of Ontario, Limited (head office, 103 Bay street, Toronto) have favored this journal with a particularly neat desk calendar and set of memorandum sheets. The souvenir is a useful one and the claim made for the bitulithic pavement that it is "the best by every test," will hardly be lost on us during 1913.

The Municipal Improvement of Calgary

Interesting Features of Sewerage Work—Gravity System of Water Supply — Various Types of Pavement Used

At present the sewerage system of this city is in a transition stage. Originally the combined system [illegible] owing to the rapid growth of Calgary this has been abandoned, and the separate system adopted. All recent extensions have been planned on the last named principle.

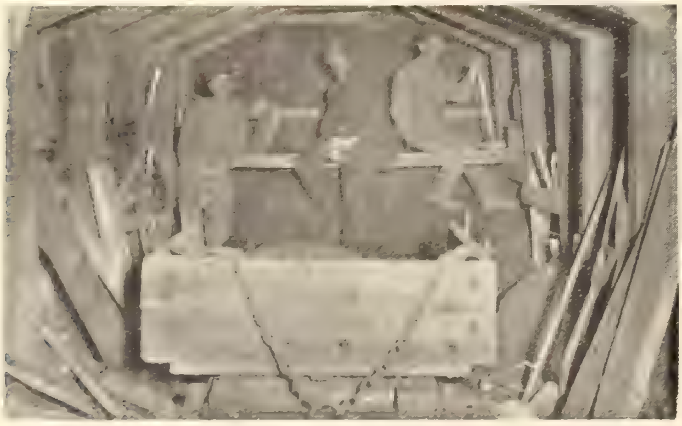
During 1912 about one and a half miles of 30-in. storm water sewers were constructed for dealing with the surface drainage of a portion of the city. All the sewage is discharged into either the Bow or Elbow rivers, through several temporary outfalls.

In 1911 a by-law was passed for $180,000, which amount, at a later date was advanced to $240,000, to cover the cost of constructing a 6-ft. diameter circular trunk sewer, from the Elbow river at Ninth avenue east along Eighth street and Eighth avenue east to Fifteenth street east, down Fifteenth street under the C. P. R. yards, to the proposed sewage disposal site at Bonnybrook, where it is intended to treat all the sewage by the latest and most effective processes.

This sewer is constructed entirely of concrete, mixed in the proportions of 1:3:5 with a facing mixed in the proportion of 1:1. Up to the present time over two miles have been completed. The average cut was about 20 ft., but progress was rather slow owing to the running gravel encountered all along the line, and to the occasional cold snaps, making it necessary to close down on all concrete work.

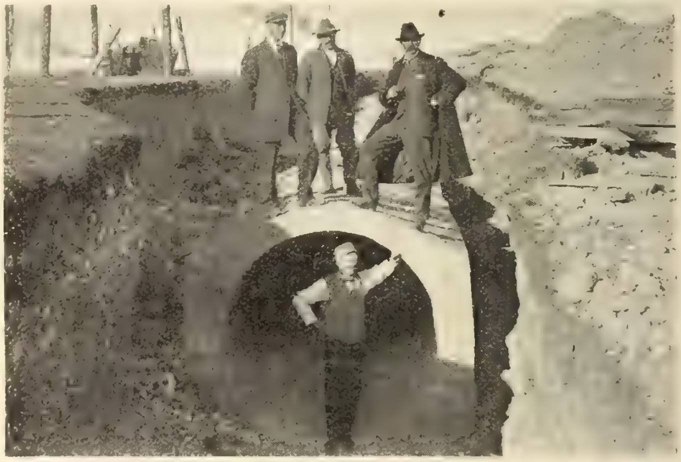
A tunnel 800 ft. long was driven under the C. P. R. yards. The driving of this tunnel was a very difficult task, the vibration from the heavy railroad traffic overhead causing a severe strain upon the centering. The method of tunnelling will be seen in the accompanying illustration. The uprights were 10 x 10, 2 ft. centres, and the cross pieces 8 x 10, with 2 x 6 lagging. The location of this sewer was arranged so that intercepting sewers from the present outfalls can be connected to it without much expense. These sewers are already constructed and will be ready for use as soon as the proposed disposal works are completed—which will be at no distant date if work on the Calgary sewerage system proceeds at the rate it has done in the past. In 1912 alone, over 54 miles of sewers were laid by day labor.

A 36-in. diameter circular concrete intercepting sewer was constructed in 1911 to take care of the sewage from the Riverside, Bridgeland and Crescent Heights districts on the north side of the Bow River and east of Centre street. A 20-in. diameter concrete pipe sewer was laid to carry the sewage west of Centre street and north of the Bow River. To lay this sewer a tunnel had to be driven through the cut bank on the north side of the Bow River, which was 52 ft. deep.



Tunnelling in sewer work at Calgary.

A scheme is now being developed for the districts in the south-westerly part of the city. The sewage from these districts will discharge into the outfall sewer in the district known as the Manchester Sub-Division. This will run from 30th avenue south along the C.P.R. right-of-way to 26th avenue and east to the 6 ft. trunk sewer on 15th street east.



Completed section concrete trunk sewer.

Water Supply

The city's water supply is obtained by gravitation from the Elbow River, the intake being situate at a point about fourteen miles west of the city. Water is delivered through a 30-in. diameter wood stave pipe into a balancing reservoir of 16,000,000 gallons capacity, from whence it passes into the service mains. The reservoir is to be enlarged later to 40,000,000 gallons.

The water obtained from the Elbow River is of exceptionally good quality, but occasionally—after the heavy spring rains—becomes turbid owing to inorganic matter held in suspension by the water. Further, during the winter time, some difficulty is experienced owing to the accumulation of needle ice at the intake, which interferes with the flow of water into the city. To overcome these difficulties the city council have been recommended to construct a new intake higher up the river, and also a storage reservoir.

If these measures are carried out, sufficient head will be obtained to supply some districts which are at a higher elevation than can now be reached at a sufficiently high pressure. The reservoir will also be a decided improvement. It will overcome the discoloration of the water during the spring, and as the water can be taken from it at a point lower than the ice formation it will also overcome this problem. Further, it will eliminate the possibility of contamination.

Gravity System

The gravity system delivers water in the greater part of the city at a pressure varying from 60 to 90 lbs. per sq. inch, but when any difficulty arises at the intake, auxiliary pumps of about 9,000,000 gallons capacity are used. The pumping station is situated on the Bow River. This originally supplied the city with water—before the gravity system was installed. It is proposed to install a new pumping station, with duplex pumps of 10,000,000 gallons capacity, on the Bow River at about 20th street west, to supply a new high pressure main which will run through the centre of the city. The latter extension will be for fire service. The fire insurance rate in this city is lower than any other city in Canada and the installation of this high pressure service will tend to lower the rate still further. Hydrants are placed at all street intersections—3 and 4-branch in the main part of the city, and 2-branch in the residential and outlying districts. In 1912 a 12-in. main was laid to supply the new C.P.R. shops in the south-easterly part of the city. This line crosses the Bonnybrook Bridge over the Bow River. To remove the possibility of water freezing in the exposed pipe, an ingenious device was resorted to. The pipe was wound with wire for electric heating, covered with felt, and boxed in with sawdust. All the work for the water system in this city is done by day labour. This has proved a decided success.

Highways

Calgary has over one thousand miles of highways. Of these, four hundred miles have been graded and forty-five miles paved. The following are the types of pavement:—treated wood block, asphaltic concrete, bitulithic, granitoid, and macadam.

Treated Wood Block.—The blocks for this pavement are made of selected pine, thoroughly creosoted, laid on a sand or sand and cement cushion, over a 5-in. concrete base, with asphalt filler between joints and expansion joints at intervals. This pavement was first laid in this city in 1909 on a thoroughfare carrying the greatest amount of traffic in the city. It has proved a first-class pavement—especially able to withstand the severe climatic conditions experienced in this part of the country. After carrying the heaviest kind of traffic in the wholesale district for a period of four years, it presents a very creditable appearance.

Asphaltic Concrete.—The whole of this pavement is laid on a 5-in. concrete base and consists of a surface 2 ins. thick of graded broken stone and asphalt to form a dense mixture over which a squeegee coat is spread and a layer of hot crushed stone rolled in over the whole. This pavement has been laid to a considerable extent in the residential districts and has proved a very desirable type of pavement for light traffic.

Bitulithic Pavement.—This pavement is built according to the Warren bitulithic construction, which consists of a wearing surface of broken stone and bitumen, laid on a 5-in. concrete base. Of late, this pavement has been laid extensively all over the city, and it seemes to be able to withstand the sudden and extreme changes of temperature, peculiar to this climate.

Granitoid Pavement.—This pavement consisted of a 5½-in. concrete base laid on a solidly rolled foundation and surface blocking of 4 inches. Although the materials used in its construction were of the best, it has not given satisfactory results in this city. Cracks have formed along the edges. Under the shock of heavy traffic, these cracks developed quickly into deep ruts.

Macadam.—This pavement has not been laid in Calgary to any great extent, a cleaner and more artistic form of road improvement generally being preferred. In 1912 a municipal paving plant capable of turning out 1,500 yds. of asphalt per day was put into successful operation. During 1912 this department laid 30,000 yds. of asphalt pavement, which has given every satisfaction. Owing to the saving it has effected, the municipal authorities contemplate enlarging the plant this year.

During the past five years ten bridges of the combined traffic and street railway type have been built. These bridges are of the overhead truss type and range from one to three spans. This type of bridge has served the purpose admirably, but in future it is proposed to build all bridges of reinforced concrete, as being more artistic and durable.

C. P. R. bridge over the Bow river, near Calgary.

The Department of Mines has just issued a general summary of the mineral production of Canada during the calendar year in 1911. The amount of copper produced in 1911 was 55,648,011 pounds, valued at $6,886,998, as compared with 55,692,239 pounds in 1910, valued at a little over $7,000,000. This represents a decrease in production of 44,358 pounds.

By provinces, Ontario gave 17,932,263 pounds, Quebec 2,436,190 pounds, British Columbia 35,279,558 pounds. No copper is refined in Canada but is exported in the form of [illegible] [illegible] and base bullion.

New C. P. R. bridge near Calgary

Electrical Facilities in Calgary

THE supply of electricity for this city is derived from two sources, hydro-electric and steam. Power is supplied by the Calgary Power Company from their water power plant at the Horse Shoe Falls on the Bow River, situated about 50 miles west of Calgary. At this plant current is generated at 12,000 volts, transformed up to 55,000 volts and transmitted to the company's terminal sub-station in East Calgary.

At the terminal station it is transformed down to 12,000 volts and transmitted to the city's receiving sub-stations at this voltage.

Calgary municipal power plant building

The city owns and operates an auxiliary steam power plant which is capable of supplying the demand for power, in the event of failure of the hydro-electric supply. This plant is considered by engineers the most modern steam plant in western Canada.

The central power house is situated on the Elbow River in Victoria Park, and is of concrete, steel and brick construction. The engine room is 136 ft. by 50 ft., and the boiler room, which is divided from the engine room by a fire wall, is 136 ft. by 83 ft. The roof is supported by steel trusses, the roofing being of fireproof construction. Great care was taken on the engine room roof to prevent sweating during cold weather. This building is equipped with a 20-ton Whiting travelling crane.

Generating Equipment.—This plant supplies power for both light and power purposes. For supplying the power for the street railway there is at present in operation one 900 h.p. 3-crank compound engine coupled direct to a railway generator, built by Dick Kerr Company of Preston, Eng. One 750 h.p. 3-crank compound engine directly coupled to a 500 kw. Allis-Chalmers railway generator. These engines run 300 r.p.m. and were built by the Robb Engineering Company, Amherst, N.S. One 1,500 h.p. synchronous motor directly coupled to a 1,000 kw. railway generator, running 400 r.p.m., built by the Dick Kerr Company.

The a.c. machines consist of the following:—

One 1800 kw. turbo-generator, manufactured by the Allis-Chalmers Company, Milwaukee, Wis., 2300 volt. 1800 r.p.m. This turbine ~~is~~ of the "Parsons" type.

One 750 kw. 2300 volt, Allis-Chalmers-Bullock generator, driven by a 1100 h.p. cross compound vertical Corliss engine running at 120 r.p.m. Engine built by the Robb Engineering Company.

One 2500 kw. turbo-generator from Belliss & Morcom, Limited, Birmingham, England, connected to Vickers, Limited, generator.

Exciter Units.—One 100 kw. motor generator set, one 100 kw. engine driven set, one 50 kw. engine driven set, all at 110-140 volts.

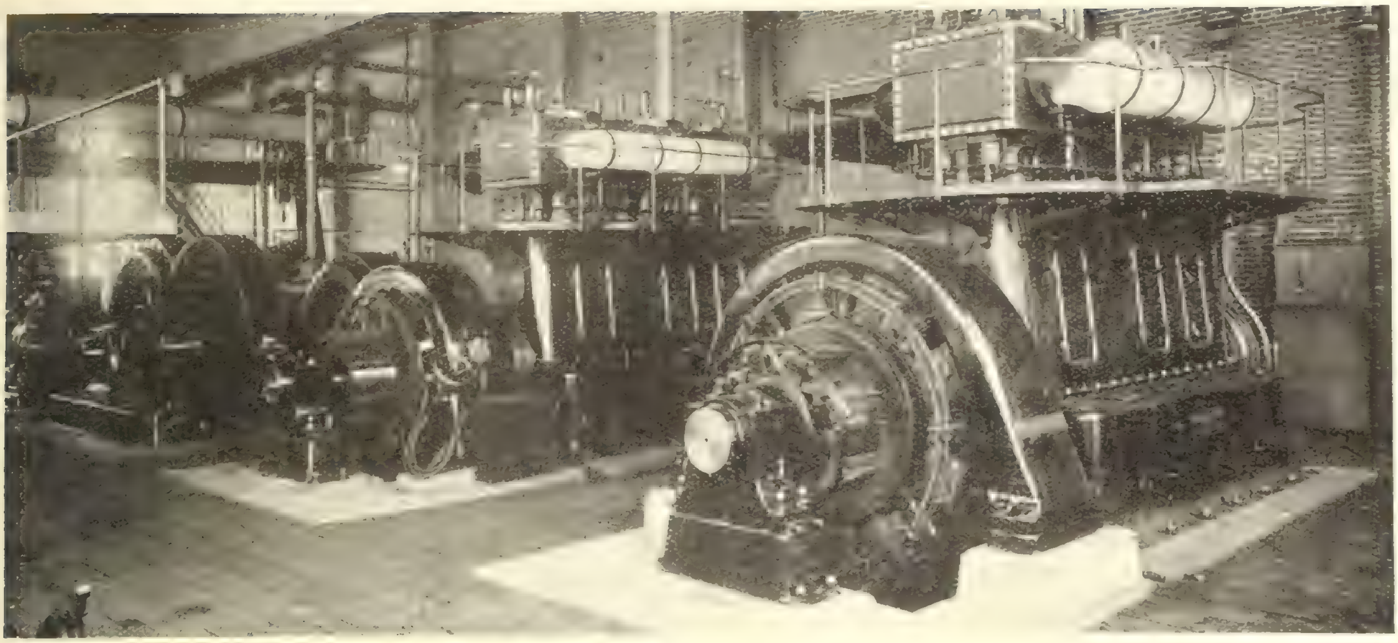
Condensers.—The condensers used in this plant are of the surface type. The water is supplied by an independent 18-in. pipe line from a point about 1¼ miles from the plant, on the Elbow River, the condensers being supplied by a gravity system. A 5,000,000-gallon capacity electrically driven turbine pump, is installed as an auxiliary to this water supply.

Switchboard.—The main switchboard is mounted on a concrete and steel gallery 70 ft. by 12 ft., supported on iron columns.

Boiler room, Calgary municipal power station

This switchboard is of 21 panels. The d.c. board has three generator panels and four feeder panels, with two feeders on each panel. The a.c. board has four generator panels, three exciter panels, one hydro-electric control panel three feeder panels, and three arc lighting control

The new shops of the C. P. R., now nearing completion at Ogden, Alta., near Calgary. The shops are the largest pass



Calgary municipal power plant. Interior from traction unit end

panels. This board is equipped with all the usual standard instruments together with recording watt-meters, power-factor meters, frequency meters, etc. The voltage is controlled by a Tirrill regulator. The steam units can be operated in parallel with the hydro-electric lines and by a system of auxiliary bus-bars can be operated independently.

Boiler Room.—The boiler plant consists of 16 Babcock and Wilcox water tube boilers, 12 of 3,580 square feet of heating surface and 4 for 2,823 square feet of heating surface. These boilers are all equipped with B & W superheaters and B. & W. chain grate stokers. The main steam heater and steam piping was supplied by the B. & W. Company. 2,000 h.p. of these boilers have been equipped for the burning of natural gas, which is proving very successful.

Draught Plant.—The induced draught plant consists of two 106-in. fans, coupled direct to two 10 in. by 10 in. vertical centre crank engines, a steel stack, 8 ft. diameter, 75 ft. high, and two 120-in. fans coupled direct to two horizontal 10 in. by 10 in. side crank engines with a steel stack 8 ft. 6 ins. diameter, 75 ft. high. The smoke flues are all underground.

Coal and Ash Handling Machinery.—The coal is unloaded from dump cars into a 40-ton hopper outside the building and is conveyed from this hopper by a tray conveyor on to the main bucket conveyor. The bucket conveyor dumps the coal into the over head steel bunkers which have a capacity of 600 tons. The same conveyor is used to take away ashes. These are loaded into the bucket conveyor on the conveyor tunnel, carried to the top of the building, where they are dumped on to a tray conveyor, which discharges them into the ash bunker of 15 tons capacity. The coal handling apparatus was manufactured by the C. W. Hunt Company, and supplied and erected by the Phillips Land & Company, Chicago, and is capable of handling 50 tons of coal per hour.

Sub-stations.—In the receiving sub-station at the central power plant there are three 1,000 kw. single phase transformers, 12,000 to 2,300 volts, with the attendant switching gear and lightning arresters. All cable entering and leaving the central power station are placed in conduits.

No. 1 sub-station.—In No. 1 sub-station there are instalstalled two 3,000 kw. 12,000 to 2,300 volt transformers, 3 phase. One 1,000 kw. street railway motor generator auto-synchronous, six Canadian General Electric 75 light mercury arc rectifier sets for street lighting, one 75 light Westinghouse street lighting set, with the attendant switching gear and lightning arresters.

In the central power station there are three Westinghouse mercury arc rectifier street light sets.

No. 2 Sub-station.—In this sub-station there are installed three 500 kw. single phase Packard transformers 12,000 to 2,300 volt, one 500 kw. Dick Kerr street railway motor generator set, one 300 kw. street railway motor generator set, manufactured by Allis-Chalmers-Bullock, with the attendant switching gear and lightning arresters. In 1912, this plant supplied the Calgary street railway with current to the

freight car repair shops in Canada. The plans were prepared by Messrs. Westinghouse, Church, Kerr & Company [illegible] kw. hours and the electric light department sold [illegible] kw. hours, the price charged for street [illegible] being 4 cents per kw. hour a.c. current, and the [illegible] the electric light department was 1,335 cents per kw. hour.

The current supplied the city by the Calgary Power Company in 1912 amounted to 19,167,891 kw. hours.

The demand for a.c. has increased 400 per cent. since January, 1911, and the demand for d.c. for the street railway has increased 110 per cent.

The street lighting system of Calgary consists of 1,000 arc lamps. In 1912 a new system of street lighting was installed on the main business thoroughfares, the lamp used being the inverted luminous arc, these lamps are placed at intervals of 100 ft.

The operation of the municipal light and power system of this city for the year 1912, made a profit for the city of approximately $45,000. The phenomenal growth of this city during the last five years has necessitated large and important extensions to supply the commercial demands for light and power.

This plant started in operation in 1905 with one unit of 260 kw. capacity, and since then it has been necessary to practically double the capacity of the plant each year. The superintendent of the power department, Mr. James F. McCall, was appointed to this position in 1905 and has remained with the city ever since. The plans for the new plant were prepared by Mr. J. E. Child, city engineer, and the construction was under the supervision of superintendent McCall, who also directed the erection of the necessary machinery, etc.

The light and power distribution department is superintended by Mr. R. A. Brown, who was appointed in December, 1911, and was entrusted with the reorganisation of this department. This task he has carried out and has given the greatest satisfaction.

At the present time this department has 10,000 customers and the gross receipts for 1912 amounted to approximately $450,000. The light and power departments of this city are under the control of Mr. A. G. Graves, Commissioner, who was elected to the office in 1910 and was re-elected in 1912. Mr. Graves' efforts for the past three years have been untiring in the interests and for the success of these departments.

Calgary Power Company's Power Development

THE Calgary Power Company, Limited, have already developed, or are at present developing, a total of 32,000 h.p. at their hydro-electric plant, fifty miles west of Calgary on the Bow River. The first units of 13,500 h.p. were put into commission during the summer of 1911; another unit of 6,000 h.p. will be ready for use during the coming summer; and a new development of 12,000 h.p. is now under way at a point a mile and a half upstream from the present power house. At the present time the company has under contract nearly 10,000 h.p. and has no provision for a breakdown, so that the new unit of 6,000 h.p. is essential for safety, and will provide for a certain amount of the anticipated growth of power requirements in the district. Extensions of their large plant at Exshaw will enable the Canada Cement Company, Limited, to almost double their requirements there, and the new plant will anticipate this, as well as take care of the undoubted growth of the city of Calgary. At present the power company has under contract with the Canada Cement Company, Limited, a total of 4,000 h.p., of which only 1,500 h.p. is consumed at their Calgary mill. The mill at Exshaw consumes 2,500 h.p. now, and the extensions under way will necessitate the use of an additional 1,000 to 1,500 h.p. within the next year. The city of Calgary have contracted for 5,000 h.p. at $26 per h.p. year, with allowance for each additional 1,000 h.p. used, up to 10,000, for $20 per h.p. year. It will thus be seen that all the power to be developed will undoubtedly be contracted for by the time the new plant is ready to deliver electrical energy.

The existing plant is constructed at a point on the Bow river known as Kananaskis Falls, where the river has cut a deep channel in the solid rock. A mass concrete dam has been built here, 400 feet long and 50 feet high, with four sluice gates, stop-log and flashboard spillways and an ice-run. The total head at this point is about 73 feet. The power house is at the foot of the dam, the water being conveyed to the water-wheels through steel penstocks, as is very well shown in the view of the dam. The present installation in this power house consists of two 3,750 h.p. Jens Orten-Boving turbines direct-connected to two horizontal-shaft 2,500

Hydro-electric development of Calgary Power Company, Limited.

kv.a. three-phase, 60-cycle, 12,000 volt, 300 r.p.m. generators, and one 6,000 h.p. Wellman-Seaver-Morgan turbine direct-connected to one 4,000 kv.a., three-phase, 60-cycle, 12,000 volt, 225 r.p.m., horizontal-shaft generator. There is now being installed another 6,000 h.p. unit similar to the above, which will be in operation by the middle of the summer.

A short distance above the present development, work has been commenced on an entirely new one to cost about $750,000. A solid concrete dam, 30 feet high, and 400 feet long, will be built. A concrete-lined canal 600 feet in length will convey the water to the entrance of a pressure tunnel to be cut through the solid rock and in which the water-wheels will be set. The total head at this point will be about 70 feet. There will be two 6,000 h.p. Allis-Chalmers-Bullock vertical-shaft turbines, connected to two 4,500 kv.a. generators. The Exshaw plant of the Canada Cement Company, Limited, is about six miles west from the new development, and the existing power line, a double-circuit, 12,000 volt transmission line, will be utilized by the new plant to supply power to this mill, and to reach the transformer station at the present plant. From there power is conveyed to the city of Calgary by two 55,000 volt, single-circuit lines over different routes, 50 miles and 58 miles long respectively, to the Calgary terminal station, there to be distributed throughout the city and to the Calgary mill of the Cement Company.

The existing plant was constructed by the Walker, Fyshe Company, Limited, during the years 1910-1911. The new plant has been designed and will be built entirely by the power company, for whom Mr. H. A. Moore is the engineer and manager. All the electrical machinery has been supplied by the Canadian General Electric Company, Limited, and the switchboard and transformer equipment has been supplied by the Canadian Westinghouse Company, Limited.

Calgary Municipal Street Railway

FOR three and a half years the city of Calgary has operated a municipally-owned street railway, having the best of equipment and an excellent service, and has received a profit since its first operation. For some years capitalists have endeavored to obtain the franchise, but the city has held firm, and time has vindicated those independents who supported the matter from the first. In 1908, the sum of $476,000 was voted by the people to build and operate a street railway system. Construction was commenced in September, 1908, one-half mile of track being laid that fall. The following spring the work again proceeded, and by heroic efforts the first two cars were in operation during the provincial Exhibition in July. By September there were in operation twelve "Pay-as-you-paved streets.

From the first, no expense was spared on the construction and equipment. Perhaps this is responsible to a large extent for the low cost of maintenance as well as operation. The track in paved sections is laid on a 4-inch sub-base of concrete, with 6-inch wooden ties spaced 4 ft., and grouted with concrete. The rails are all 60 lb. and 80 lb. Lorain 6-in. and 7-in. section, 60 feet long. All intersections are of the best Manganese steel. Tubular steel posts are used in the paved sections of the city, and the overhead feeder wires are of aluminum.

Upon the completion of the work as first estimated, there was left a surplus sufficient to purchase six additional cars. In September, 1910, another by-law was passed to extend the line 24 miles, and to purchase twelve additional cars and equipment at a cost of [illegible]. In October, 1911, a further by-law was passed to construct twelve additional miles of street railway, purchase 18 passenger cars, one observation car, and one sprinkler car, besides providing for new equipment and additions to the car barn. By other by-laws the system has been added to until as to mileage and equipment, until at present there are in operation 53 cars and 60 miles of track, requiring 275 employees. The gross revenue for the year 1912 was $606,083.87, and the net profit over and above interest, sinking fund, and 5 per cent. of the gross revenue for contingent fund, was $116,000. The total number of regular passengers carried during the year was 1,760,987.

Power is bought from the City Power Department at the rate of 2 cents per kilowatt-hour, a total of 1,200 kw.-hours being consumed at present. The power is supplied by one 300 kw. motor generator, and one 1,500 kw. motor generator, for which the power is purchased from the Calgary Power Company, Limited, and there are in addition as auxiliaries two 500 kw. direct-connected steam units.

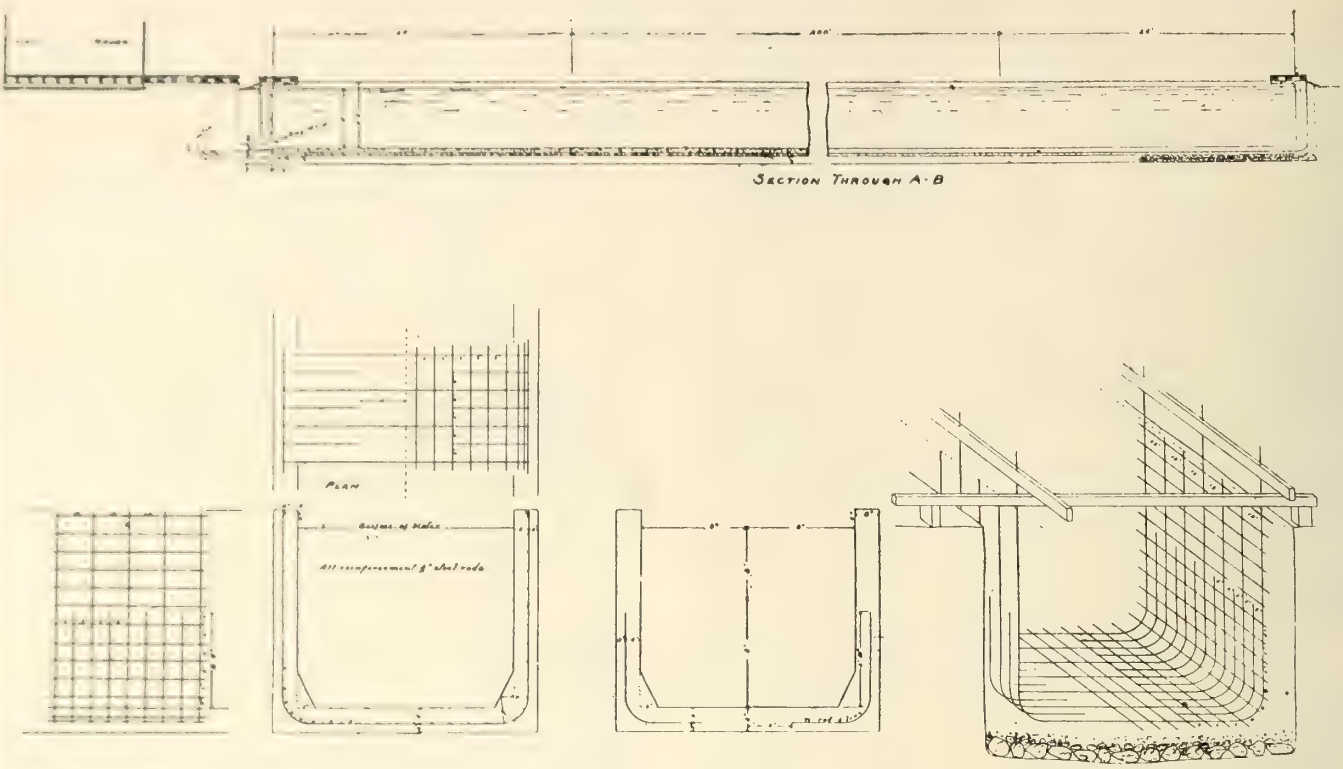
A Reinforced Concrete Tank at a Current Meter Rating Station at Calgary, Alta.

IN designing the work for this station the aim was to gain the most perfect apparatus possible for rating the current meters and to create a permanent structure, so that it was early decided to use concrete in the construction of the necessary tank.

As no stretch of still water having a suitable length and depth was available, it was necessary to create a tank, and in studying its design two points had to be principally considered. First, as the water supply had to be taken from the city mains, the tank had to be made proof against any leakage. Secondly, the cross-sectional water area was required as small as possible and yet of sufficient dimensions to guard against any following on movement of the water, in running the meters through the tank. To overcome the first difficulty a heavily reinforced structure was designed, such that being emptied and exposed to the weather in winter no temperature cracks could develop, and the inside faces of the tank were water-proofed by Sylvester's difficulty no data were obtainable, but with the tank as constructed no following on movement or undue disturbance of the water has been observed even with the largest meters tested at velocities as high as 10 ft. per second. The length of the tank (250 ft.) was adopted in order to bring the cost of the structure within the liimts of the amount of money available, but provision has been made for [illegible] the tank [illegible] length of 500 ft., which is desirable in order to attain the highest degree of accuracy.

General view of reinforced concrete tank for current meter rating station, Calgary

The concrete tank is 250 ft. long with an inside width and depth of 6 ft. by 5 ft. 6 ins., and the depth of water to be maintained is 5 ft. The [illegible] are reinforced heavily, longitudinally and transversely, with ½-in. round mild steel rods, in order to absolutely preclude any temperature cracks in the concrete. The concrete was specified a mixture of one part Portland cement [illegible] parts clean river gravel, to have at least fifteen turns in a



Elevation

Sections

Reinforced concrete tank for current meter rating station, Calgary

good machine, and to be placed wet and thoroughly tamped. All the interior faces were thoroughly spaded in order to create a smooth close-grained surface, to which to apply the Sylvester's wash. All steel rods at joints were overlapped 16 ins., and it was specified that they were to be wired so as to have contact throughout the whole of this length. The tank floor was laid on an 8-in. foundation of large stones overlaid with smaller stones and gravel in order to provide thorough drainage for any water which might leak through the tank, so that when the tank is emptied in winter and exposed to the weather no heaving might result from any water being lodged under the tank bottom. The soil beneath is of sandy character, which is permeable to water. The water supply is from a 2-in. iron pipe laid from the city mains, and a 6-in. tile drain 224 ft. long, fitted with an iron gate valve at the tank, allows the tank to be emptied at any time into the river. After the tank was completed, all the inside faces were treated with two coats of Sylvester's wash. Up to the present the tank has been twice exposed empty to severe cold with the thermometer at 30 below zero and no cracking of the concrete whatsoever has resulted, except a few hairline cracks near the top of the walls. As regards the waterproofing two observation shafts were left along the tank sides running down to the foundation, and no leakage whatever was observed during the summer when the tank was full, except a slight dampness at the bottom of the side walls. It should be noted that another reason why it was desired to make the tank leak-proof is that it is intended to obtain evaporation records at the tank in future seasons. This work was carried out for the province under the supervision of the Chief Engineer, Mr. F. H. Peters, to whom we are indebted through our contemporary, Concrete and Constructional Engineering, for the data and illustration.

At Montreal last month 105 permits for new buildings estimated to cost $458,600 were issued. This compares with 69 permits and a value of $272,490 for January, 1912.

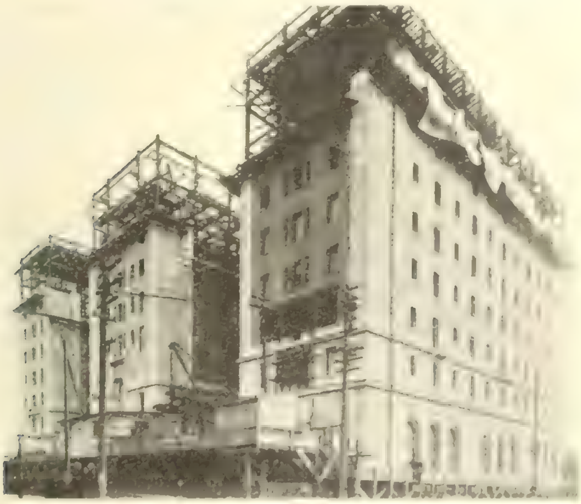
The New C.P.R. Hotel at Calgary

THE hotel now under construction in Calgary for the Canadian Pacific Railway is probably the largest structure between Winnipeg and the Pacific coast. Occupying as it does an area 128 feet by 220 feet, the present building will be 148 feet high from the avenue grade to the top of the elevator pent-house, being eight storeys high. Provision is made for the addition of four other storeys, which will give a height of close to 200 feet above the sidewalks. Construction was commenced on the foundations during the fall of 1911, and except for a delay of some three months during the early part of 1912, the contractors have made very rapid progress. P. Lyall & Sons Construction Company, Limited, have the general contract

Commencement of steel superstructure for $1,500,000 C. P. R. hotel, Calgary for the entire building and for the power house and its connecting tunnel. The architects are Messrs. E. & W. S. Maxwell, of Montreal, and the construction is under the direct supervision of Mr. F. E. Ellingwood, Superintendent of Building Construction for the Canadian Pacific Railway Company. The estimated cost is $1,500,000 completed.

The foundations are in general concrete walls on reinforced concrete footings. The basement was excavated below the street on three sides, the fourth side being against the subway beneath the main line tracks of the railroad. The principal difficulty was encountered in the excavation against the embankment fill for the railroad, and this was found to be so soft as to require shoring. For this purpose the contractors drove over 7,000 lineal feet of wooden sheet piles, the longest lengths being about thirty feet. One 4-inch, and one 6-inch centrifugal pump was found to be sufficient to keep down the flow of ground water during concreting. Solid concrete floors reinforced against upward thrust were placed throughout the basement.

The frame of the building is structural steel, 2,700 tons of which was furnished by the National Bridge Company, Limited, of Montreal. Had it not been for the delays incidental to the delivery of this steel, the contractors would have been at least three months ahead of their present progress. The columns were in general of H-sections, set on cast-iron bases, and except for some heavy girders in the ceiling of the ground floor, the steel work is the ordinary cage construction. Above the ground, or main floor, the building is divided into three wings by light wells on the far side from the railroad, and in the event of the four additional storeys being erected, these bays would be in the nature of towers, being but fifty feet wide by eighty feet long, and over 140 feet high. To take care of the stresses which would undoubtedly be set up by the high winds at times prevalent in this prairie country, wind-bracing, in the form of knee posts and plates, have been inserted in the lower storeys on the narrow ends of these towers. The consulting engineers on the steelwork were Messrs. Purdy & Henderson, of Montreal and Vancouver. The structural steel will be fireproofed with a covering of concrete, and all floors will rest on 5-inch solid concrete slabs reinforced with one-half-inch round rods, there being about 4,500 cubic yards of concrete to place. To date the erection of all the steel [illegible] completed, and the concrete has been poured on the fifth floor above the street.



C. P. R. hotel, Calgary. From a recent progress photograph

As will be seen from the photographs, the exterior is of cut stone and brick. In all, there were 30,000 cubic feet of dressed limestone laid in the structure. The entire ground floor is faced with limestone and except for the elevation against the tracks, the first bedroom floor is also faced with cut stone. Cut stone is also used for the quoins on all corners, running to the main cornice. Although the men interested in the construction company are owners of fine limestone quarries in eastern Canada, it was found to be more expedient to import the limestone, dressed and cut, from the United States. All the stone used was furnished by the Kettle River Company, of Minneapolis, from their Bedford quarries. The face bricks are all selected buffs supplied by David McGill, of Montreal, from the Union Furnace Company, of Columbus, Ohio. There will be a total of 300,000 face brick used, with 2,000,000 common brick furnished by the Alberta Clay Products Company, Limited, of Medicine Hat. All exterior brickwork has been laid from a moving platform for which 100 patent safety scaffolds have been used. Ninety per cent. of the brickwork has been completed to date. During cold weather, concreting was carried on, the brick exterior walls being kept one storey in advance, supplying an enclosure which enabled the contractors to heat the building without the expense of a canvas covering.

In plan the building is a rectangle, with one side, 220 feet long, parallel to and alongside the main line of the railroad. There will be seven bedroom floors above the main, or public floor, with provision for four additional bedroom floors. In the basement will be a barber shop, sample rooms, baggage areas, and the transformer and fan rooms and the elevator machinery. The hotel and station will be connected by a subway for the transfer of baggage and provisions. The main entrance will be from Ninth Avenue and away from the tracks. Immediately in front of the entrance lobby will be a large rotunda, or lounging space, forty feet wide and 150 feet long, with eighteen marble columns ranged around the room.

All the main rooms on the ground floor run through the mezzannine floor, and are 22 ft. 6 in. high.

The floors throughout are of Tennessee marble, with a wainscoting of Botticcino marble.

On the right of the entrance is the drawing room, with a panelled and groined ceiling of ornamental plaster, opening onto the rotunda in front, and to the main dining room which runs along the entire west end of the floor and is 40 feet wide and 120 feet long. The dining room is finished in panelled old English oak, the wainscoting being 7 ft. 6 in. high. The floor of the dining room is of oak, the only wooden floor on the main level. To the left of the entrance is the palm room, 40 feet by 50 feet and similar to the drawing room. Opening off the end of the rotunda is the bar, 40 feet by 55 feet, also finished in panelled old English oak, with red quarry floor and marble columns; and the cafe, similar to the bar, and the same in size. The kitchen lies between the cafe on one end and the dining room on the other end, and is against the tracks, being about 40 feet wide and 150 feet long, and will have white tile floors and wainscoting. The elevator hall juts into the kitchen from the rotunda in the centre of the building. There are to be four passenger and one service elevator, all of the Otis-Fensom hydraulic plunger type. There will be a small mezzanine floor, for [illegible] offices and [illegible] rooms. On the first floor there will be a large ball room, 20 feet high, and 42 feet by 60 feet in length. The floor will be oak, and the finish will be similar to the oak trim on the main floor, the walls and ceiling being rough plastered. In connection with the ball room there will be private dining rooms and smoking rooms, the remainder of the floor being devoted to bedrooms.

There will be a total of over [illegible] bedrooms, all inter-communicating in suites, two-thirds having connecting bath rooms. The trim in all bedrooms will be birch stained to a mahogany color, with plastered walls and ceilings, and [illegible] The bathrooms will have tile floors and wainscoting. There will be a lavatory in each bedroom, with ice water connection.

On the top of the building there will be a sun parlor, and a roof garden. The bedroom floors will be heated by steam, but the main floor will be heated by forced draft, with a [illegible] supply and recirculating fans. There will be a [illegible] cleaning system installed throughout.

The heating and plumbing and ventilating installations are being made by [illegible] Limited, of Montreal and [illegible].

All screens will be copper wire, to be furnished by Messrs. Cluff Bros. Limited, of Toronto. All partitions will be of gypsum blocks, furnished by the Keystone Fireproofing Company. Yale & Towne hardware will be used througout. The painting and decorating will be done by the Taylor Painting & Decorating Company, of Winnipeg and Calgary; the electrical installations by Messrs. Parker, Chase & Company, Limited, of Calgary; the plastering by the general contractors; sheet metal and roofing, by Mr. D. R. Foulds, of Calgary. The interior trim will be furnished from the shops of the contractors in Montreal.

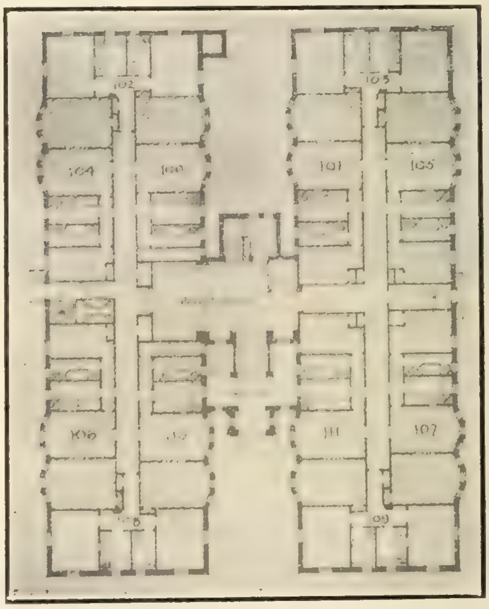
In connection with the construction of the hotel, the contractors are building an addition to the existing power plant already used for heating the station. The plant is situated across the tracks from the hotel, and is already connected by a reinforced concrete tunnel, 7 ft. 6 in. high. 7 ft. wide, and almost 500 feet long. This tunnel will be used for the piping and for conveying laundry to and from the hotel. The additional plant is built against the old power house and when completed the building will be 320 feet long by 50 feet wide, one storey high. The west end will be fitted up for a most up-to-date laundry, and will be devoted entirely to the use of the hotel. Between the old and the new boiler rooms there has been built a radial brick smoke stack, 200 feet high, and 17 ft. 4 in. in diameter at the base. The power house is now under construction, and is being built of the same buff brick as was used for the hotel. It will be fitted with solid steel sash, and will be fireproof in every way. There will be installed a total of five boilers, aggregating about 2,500 h.p. Since the construction of the stack it has been decided to use natural gas as a fuel, since it has proved to be very successful as well as economical. The total cost of the building with tunnel and stack, exclusive of the mechanical equipment, will be about $50,000.

Anderson Apartment House, Calgary

THE apartment house recently completed by Mr. V. Anderson, of Calgary, is the largest building in the city, except the new C. P. R. Hotel now under construction, devoted entirely to living apartments. Situated in one of the most desirable parts of the town, the building occupies a site 75 feet wide and 130 feet long and is practically six storeys high, since the ceiling of the basement is eight feet above grade. The entire building contains sixty-four suites of two and three rooms with bath and kitchen complete, and is a thoroughly modern structure in every sense, fireproof in its construction and well appointed in its conveniences. There is a large cafe in the basement, with janitors' living quarters, boiler rooms, storage rooms, etc., and a large palm room on the ground floor, but all other floor areas are divided into suites for rental. The building is practically two separate structures, connected by the stair and elevator shaft, so that every room has an outside window. The exterior of the building is red face brick, with lintels, sills, cornices, and other details in cast concrete. The exterior walls are furred with gypsum blocks, and all partitions are of the same material

Anderson Apartments, Calgary

There are four two-room and eight three-room suites on the typical floors, with bath and kitchen attached. The interior trim of all principal rooms is oak; the floors are of maple laid on a cinder fill. The baths have terrazzo floors, 4-foot tile wainscoting, and enamelled pine trim. Two Otis-Fensom elevators, one freight and one passenger, are installed. The lighting fixtures are all electrical and all kitchens are furnished with natural gas ranges with vent pipe to the outer air. There is a complete vacuum system throughout. The building is heated by steam, with a Webster Modulation System, two 75 h.p. horizontal tubular boilers being used. All rooms have telephones installed. The owner built the structure himself, hiring his own superintendent and sub-letting all work except the rough construction. The architect was Mr. R. B. Whitten, of Calgary. The estimated cost of the building was $175,000.



First floor plan, Anderson Apartments

Horse Shoe Bend Dam Eastern section C.P.R. Irrigation Block

C. P. R. Irrigation Projects in Alberta

Progress Details of Comprehensive Scheme Now Under Way A Territory Divided into Three Sections of About One Million Acres Each

THE great irrigation scheme which the C.P.R. is now carrying out in the province of Alberta was the subject of an extensive article by Mr. A. S. Dawson, Chief Engineer, Department of Natural Resources of the C.P.R., published in our issue of April 24th last. A reading of that article will be helpful in a perusal of the photographs reproduced on the opposite page but to facilitate present reference we give below a brief resume of the previous article, together with addition information especially contributed for this issue.

General Description of the Canadian Pacific Railway Company's Irrigation Projects

Surveys showed that three extensive areas offered special advantages for irrigation; one containing some 150,000 acres, situated in the Lethbridge district, which could be supplied from the St. Mary's river; a second, containing about 350,000 acres, lying near the junction of the Bow and Belly rivers; and a third, a much larger one, situated along the main line of the Canadian Pacific Railway, and extending about 150 miles east of the city of Calgary. The works to serve all of these tracts have either been built, or are now under construction.

Lethbridge Section

The first mentioned project above referred to, and generally known as the Alberta Railway and Irrigation Company's system was acquired by the Canadian Pacific Railway Company in the spring of 1912 and is now being operated by the last mentioned company.

The head gates and diversion works are located on the St. Mary's river, 50 miles southwest of Lethbridge. Construction of the system was commenced in 1898, and the main canal has been enlarged to carry about 800 cubic feet of water per second. The mileage of canals and ditches operated by the company is about 200.

The third mentioned project passed into the hands of the C.P.R., and is now known as the Bow Valley Irrigation Block.

Surveys in connection with the project were commenced by the railway company in 1903, and have been gradually extended in detail since that date. This represented a vast amount of work; as an irrigation project demands surveys and examinations far more complete than those for a railway line. Elevation is the controlling feature; and lateral extent or width of country is as important as length; and width, length and height have all to be considered.

Accurate topographical surveys have been carried on by plane-table methods over practically the whole Block, on which the complete system has been projected.

On the completion of the preliminary surveys it became evident that the Block naturally divided itself into three sections, which were designated as the Western, Eastern and

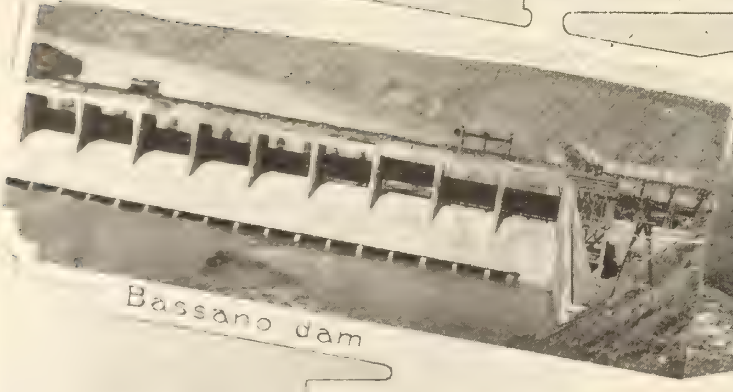
Excavation of main canal Eastern section C.P.R. Irrigation Block

Secondary canals, B and C

Rating station, north branch canal

Graham creek flume

Inclined flume



Bassano dam

Drop at north branch canal

Springhill canal headgates

C.P.R. Irrigation Projects in Alberta

Central, of about one million acres each; and the work is being carried on along the lines of development in the order named.

Western Section

The Western Section is composed of 1,039,620 acres, of which 370,000 acres have been brought under irrigation.

The water for the irrigation of the Western Section is diverted from the Bow River at a point about two miles below the city of Calgary. From there it is carried south and east through a main canal 17 miles in length, which in part is 60 feet wide on the bottom, 120 feet wide at the water line, and designed to carry water to a depth of 10 feet. The larger portion of this canal, however, is 44 feet bed width and 84 feet on the water line.

This main canal delivers water to a reservoir, for which a natural depression has been utilized, and where by the erection of a large earth dam a body of water three miles long, half a mile wide and 40 feet in depth has been created. Just before reaching this reservoir the main canal makes a vertical drop of 10 feet.

In the Western Section of the Block the following mileage of waterways has been constructed:—Main canal, 17 miles; secondary canals, 254 miles; distributing ditches, 1,329 miles; total, 1,600 miles.

In addition to the above, there are several hundred miles of small ditches constructed by the farmers to distribute the water over their farms.

The structures, consisting of headgates, spillways, drops, flumes, bridges, weirs, etc., are numbered in thousands, and in their construction ten million feet B.M. of timber and ten thousand cubic yards of reinforced concrete were used.

In completing the canal system of the Western Section ten million cubic yards of material were excavated.

Of its total area, both irrigable and non-irrigable, less than five per cent. remains unsold.

Eastern Section

The Eastern Section of the Block is composed of 1,156,224 acres, of which 440,000 are to be rendered irrigable. Most of this land is of a gently rolling character, and susceptible of good drainage.

This system will be an entirely independent one from the Western and Central Section systems, having an independent intake, located about three miles south-west of Bassano, a point on the main line of the Canadian Pacific Railway 83 miles east of Calgary.

The system as outlined from the surveys will take advantage of a low pass through the rim of the Bow Valley at the point above referred to, locally known as the Horseshoe Bend to take water from the river by an independent intake at that point. A dam is being built across the river at this point which performs two functions: first, it raises the level of the water at the intake, thus enabling the system to command a much larger area of land than it would otherwise do, and secondly, it reduces the quantity of material to be removed from the main canal heading at the dam.

This structure is being built on the Bow River at a point locally known as Horseshoe Bend, distant about three miles south-west of Bassano. At the site where the structure is being built the ordinary low water level is elevation 2515.00. The elevation of the sills of the canal headgates is 2549.63, and it was desired to raise the water to give a depth of 11 feet above these sills, making normal water level of the dam 2560.63.

The dam is to be a composite structure, consisting of a long and high earthen embankment on the south bank of the river, and a reinforced concrete spillway in the existing river channel, connected at its northerly end with the canal headgates.

Just above the site of the dam the river makes a bend, in the shape of a horseshoe, which gives the locality its name, the dam being located at the toe of the horseshoe. At this point the river is approximately 600 feet wide. The north and left bank of the river has a narrow bench immediately at the water's edge and only a few feet above it, beyond which is a cut bank rising over 100 feet above the bed of the stream.

The south or right bank has a gravel beach rising gradually until it forms a tongue between the two legs of the horseshoe. This tongue has a broad flat top several hundred feet in width and rises gradually to the general prairie elevation. The general elevation of the surface of this tongue near the river is about 25 feet above the bed of the stream. On this tongue an earth dam is now under construction, to which the spillway structure will be joined.

The earthen embankment has a maximum height of about 45 feet, a total length of about 7,000 feet, and at its highest point is 350 feet in width at the base. It contains about one million cubic yards.

The wetted slope is 4 to 1, the dry slope 3 to 1, and the top width 32 feet, with a freeboard of 9 feet above normal water level. Provision has been made for under drainage, and its upper slope is paved with concrete slabs. The spillway was designed to pass over its crest 100,000 second feet without raising the surface of the pool above elevation 2562.63, or 13 feet over the crest, which required a free length of weir of about 600 feet. To allow for end contraction on account of the piers necessary to support the moveable crest, an aggregate length of 650 feet between piers was decided on.

As the crest of the dam and the sills of the canal headgates were fixed at elevation 2549.63, the additional depth of 11 feet for which the canal was designed had to be maintained by some form of moveable crest for the entire length of the spillway, in order to pass extreme floods. This moveable crest is divided into 24 sections and supported between piers giving 27 feet clear spans. These openings will be regulated by structural steel gates.

In the determination of the spacing of the buttresses due consideration was given to the effect upon cost of construction the time required to build the structure, and the limitations in length of the gates corresponding to the spacing of the buttresses, with the result that these are at 15 ft. centers, with every second buttress carried up in the form of bridge piers, with clear spans of 27 feet. An auxiliary gate is provided in case of necessary repairs having to be made to the main gates.

The system to serve the Eastern Section is a very large undertaking, involves a great many large and important structures, and the details of construction are being worked out with all possible care, it being the intention to make use of reinforced concrete or other permanent construction in all important structures.

The estimated mileage of canals and ditches to serve this portion of the Block is as follows:—Main canal, 5 miles; secondary canals, 475 miles; distributing ditches, 2,020 miles; total, 2,500 miles.

The earth work which it is necessary to remove in connection with the construction of the above mentioned canals and ditches will amount to over 20 million cubic yards. The structures, numbering thousands, will include drops, head gates, flumes, syphons, bridges, etc., and to a large extent will be built of reinforced concrete.

Central Section

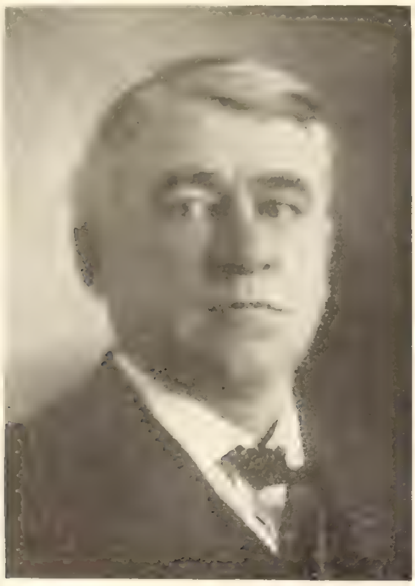
This section contains [illegible] acres, and it was at first contemplated to irrigate about one-quarter of this area. Up to date construction of this portion of the system has been held in abeyance.

The Evolution of a Builders' Exchange

Calgary a Conspicuous Example of Successful Organization in the Building Trade—The Local Body and Its Work

CALGARY builders were first organized in the spring of 1908, with Mr. A. W. MacKinnon, now manager of the Western Planing Mills, Calgary, as President of the Builders' Exchange, and with Mr. E. L. [illegible] manager of the Alberta Provincial Exhibition as [illegible]. After a short existence, the Exchange was re-organized in March, 1910, with twenty-two members, of whom twenty are yet active in the Exchange. The [illegible] month fifteen members were added, and the Exchange has continued to grow until at the beginning of [illegible] there are 114 members on the roll—an increase of fifteen over the previous year.

The first President under the new organization was Mr. R. A. Brocklebank, who was re-elected and served during the year 1911. For 1912, Mr. J. W. Aldridge, of Geo. H. Archibald & Company, Limited, of Winnipeg, was elected President. Upon Mr. Archibald's removal in the early part of the year to become Construction Manager for his company, Mr. W. J. Richards, of Richards Bros. Company, Limited, general contractors and owners of the City Planing Mills, was elected to fill the vacancy. At the last annual meeting, on January 8th, 1913, Mr. Brocklebank was again elected to be President, in token of the confidence imposed in him by his colleagues in the building trade.



Mr. R. A. Brocklebank, President
Calgary Builders' Exchange

Mr. Brocklebank has been a resident of the city of Calgary for many years. For the past eight years he has been a member of the city council, and was a candidate for mayor at the last civic elections. Mr. Brocklebank has had an extended experience in the contracting field and has an enviable reputation among the men who have built the city. Among the better known buildings for which he was the general contractor are the Judge Travis Block,—the present quarters of the Builders' Exchange—the new public library, the new Oddfellows' Hall now in course of completion, the Crown Block, the Y. W. C. A. Building, and numerous warehouses and other smaller buildings. The careful attention given to all matters has led to success in his business, and has well merited the confidence placed in him by his fellow-members in electing him to be president for the third time.

The first vice-president, Mr. Jas. Marr, of the plumbing firm of that name, is well known throughout the city, and is noted for his conscientious attention to all duties thrust upon him. Mr. Marr is the secretary-treasurer of the Canadian National Association of Domestic, Sanitary & Heating Engineers.

Mr. R. J. Priestley, local manager for the Wm. Head Company, Limited, of Winnipeg, is the second vice-president. Mr. Priestley is enthusiastic in the interests of the Exchange—always willing to devote a little of his time to the betterment of the conditions of his fellows—a hard worker—and sure.

Mr. Fred Jones, of Jones & Lyttle, Limited, general contractors, is the 3rd vice-president, and is generally regarded as a "live wire." The firm of which he is the senior member have done a good portion of the work in the city and have now about completed a large school, costing $142,000, and also the new $150,000 warehouse for the Cockshutt Plow Company, Limited.

The Secretary of the Exchange is Mr. W. W. Hay, formerly with Mr. W. S. Painter, of Montreal and Vancouver.

Recently the Builders' Exchange has been undergoing another re-organization, although not in its external aspect. It has been found that a great deal of time is lost, and energy wasted, because at times matters have come up for discussion which have been of particular interest to only a small part of the members, and others, forced to aid in the business before them, have been discouraged from attending the meetings. Again, in the general meetings, the members of the same trades have not the best opportunity to become acquainted with one another or to discuss matters of interest to themselves alone, such as labor conditions, methods of the trade, and other matters of peculiar interest to themselves. At the end of the past year a movement was started to organize the various master tradesmen in their own associations, so as to bring the members closer to one another through matters of interest. The general contractors have thus been organized and meet every Saturday for luncheon. Among the other trades organized in this way are the plastering contractors, the sheet metal and roofing contractors, the supply dealers, and the plumbing contractors—who were already organized through their National Association. Among the members now there is a spirit of progress—a desire to better the conditions under which they must compete with one another—and the coming Convention is welcomed by many as presenting an opportunity to compare experiences with others, thus to arrive at the desired result through the combined ideas of all the Dominion.

The Calgary Builders' Exchange is at present occupying quarters in the newly completed business block owned by the Estate of the late Judge Travis, of Calgary. Three of the office suites on the top floor have been thrown into one large room, about 24 feet wide by about 42 feet long, for use as a meeting room, with another suite used as the Secretary's office and as a cloak room. At present there is no exhibit of materials and specialties such as is to be seen in so many Exchanges throughout the Continent, though the Secretary has been endeavoring to encourage the

J. W. Morley, Winnipeg, President

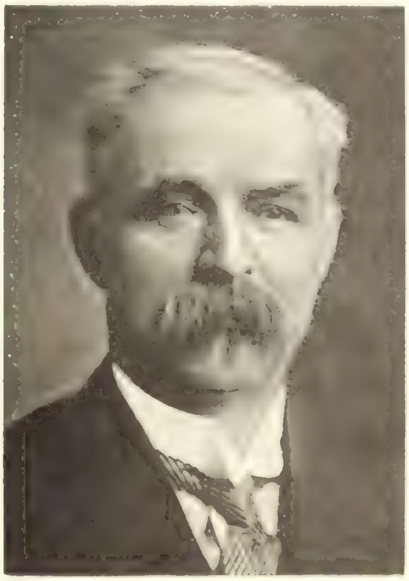
J. H. Lauer, Montreal, Secretary.

E.T. Nesbitt, Quebec, Hon. President.

Geo. S. Gould, London, Prov. Vice-Pres.

President and part of the Directorate of the Canadian National Association of Builders' Exchanges.

Seventh Annual Convention, Calgary, February 18-20.



Jno. Aldridge, Toronto, Director

W. A. Wilson, Regina, Director

Wm. Nutkins, London, Director

Jas. Ballantyne, Montreal, Director

[illegible] exhibit. Lately the manufacturers of clay products throughout the province have been attempting to form an organization, and it is hoped that they will have a creditable exhibit of their products at the meeting of the Convention.

At first the Exchange shared the rooms occupied by the local Board of Trade, first on the site of the new C. P. R. Hotel, and later in the [illegible] Block, but the growth in membership warranted the quarters in the Judge Travis Block, which they have occupied since the latter part of February, 1912. This building is the middle of three business blocks erected at the same time. On the corner of Seventh Avenue and First Street East is the Beveridge Building, 50 feet by 130 feet; then, along the avenue, is the Judge Travis Block, 75 feet by 130 feet; and next that is the building of the Alberta Loan & Investment Company, Limited, 50 feet by 130 feet. All these buildings are five storeys high, and present a uniform appearance, as though they were a single building. The exterior is red face brick, with sandstone band courses and lintels. The ground floors of all three are devoted to stores.

The Judge Travis and the Beveridge Blocks have a common entrance and also a common stairway and elevator shaft. Two Otis-Fensom elevators serve these two buildings, the cages being steel grills, coppered. The upper floors are used almost entirely for office rental. The building is of slow-burning construction, with wooden glazed partitions and with wainscoting. The trim is B. C. fir throughout. On each floor there are lavatories and a bath, tiled and well fitted. The elevator shaft is separated from the buildings by brick fire-walls and concrete floor slabs, and has hollow metal fire-doors into the main corridors. All the windows on the light shafts are hollow metal, wire-glazed, and there are also fireproof vaults on each floor.

Judge Travis Block—home of the Calgary Builders' Exchange

The architects of the Judge Travis Block were Messrs. Hodgson, Bates & Beattie, of Calgary. The contractor was Mr. R. A. Brocklebank. The cost was about $120,000 complete.

The Central Railway of Canada are proposing to build a line from Rosalie to Montreal and thence to Midland, with a branch to Goderich. If the Dominion Government agree to this the Intercolonial railway will be granted running rights over the line. The company are asking for the usual subsidy of $3,000 for 340 miles of railway and if the Government grants them this subsidy the Central Railway of Canada bind themselves to handle grain between Port Arthur and Montreal at 4½ cents a bushel.

The Alberta Provincial Association of Builders' Exchanges

THE Alberta Association of Builders' Exchanges was organised at a meeting held in Calgary during March, 1911, at which 28 members of the Exchanges of Lethbridge, Medicine Hat, Edmonton and Calgary were present. Mr. H. J. Goode (who later became President), of Lethbridge, was elected Chairman. The feeling was that the National Association was too cumbersome for handling matters of interest to the province only, and that such subjects as the Lien Act and other legislation, agreements, uniform wage scales, and other matters might be dealt with by a provincial body.

The second annual meeting was held in Lethbridge on March 16th last, at which there were 48 members presem. At this meeting, Mr. C. C. Batson, of Edmonton, was elected President. A Committee met a deputation from the Alberta Architects' Association, and there was adopted a Uniform Contract Form for use throughout the province by architects and Builders' Exchanges alike. Various recommendations were made, and it is hoped that at the next meeting a satisfactory set of amentments to the Mechanics' Lien Act and to the Workmens' Compensation Act, both of which are rather unsatisfactory in their present amended form, may be reached. Also, an attempt will be made to adopt a Uniform Sub-Contract Form for use throughout the province, similar to that now in use by the Winnipeg Builders' Exchange. It is highly probable that the next meeting will be held in Edmonton, immediately following the National Convention in Calgary, as there will undoubtedly be many visitors and delegates to that Convention who will go to Edmonton. Working in conjunction with the individual exchanges on the one hand, and with the national organisation on the other, there is much that the provincial association can bring about to aid and protect the many interests concerned in building construction.

Canadian Railroad Development

The Canadian Pacific Railway Company has awarded contracts for 807 miles of new line to be constructed in the west during the present year.

Mr. J. S. Englehart, Chairman of the Toronto and Northern Ontario Railway, stated that they were directing their best efforts to find a feasible route from Elk Lake to Gowganda and that they had already spent $30,000 in surveys from various points.

Surveys will shortly be started for an electric railway to connect Fort Erie with Fort Colborne and other nearby towns in Ontario. The road will be known as the Niagara Falls, Welland and Lake Erie Railway. Welland will be the site of the general offices.

Actual operations are expected to commence by March 1st on the Canadian Northern Railway Company's buildings to be erected at Port Mann, B.C. The buildings will contain all that is necessary for the repair of engines, freight cars and passenger coaches.

The city commissioners of Regina will receive bids until the 24th of February for track and trolley material for the Municipal Railway. Full particulars of the material wanted can be obtained from Mr. H. Doughty, Superintendent of the Regina Municipal Railway.

Experiments which are being carried out on some English railways seem to show that oil may eventually displace steam driven engines. It is claimed for the new invention that it will make possible the propulsion of a heavy train at a greater speed and at a lesser cost that at present.

Some idea of the progress that has been made by the rialroads in Canada during the past few years, may be obtained from the fact that in 1905 the total number of miles of rails in the province of Alberta amounted to 946, whereas at the end of 1912 this figure had been increased to 3,020.

The Wetaskiwin, Yellowhead and Revelstoke Railway Company are asking the Government to grant them an incorporation. The proposed line is from in the neighborhood of Lloydminster to Wetaskiwin, thence westerly over the Saskatchewan River to Yellowhead Pass and on to Revelstoke.

Sir Donald Mann, vice-president of the Canadian Northern Railway, recently stated that his company were going to concentrate every effort on the completion of their main line in British Columbia, and that work on the laying of rails at Union Bay would be proceeded with immediately. Tenders have already been asked for on the work into the Songhees district.

Sir Thomas Shaughnessy, president of the Canadian Pacific Railway, stated that his company had practically decided on their work on the western division for the present calendar year. This will include the finishing up of some three hundred miles of new line and the building of five hundred miles in addition. The new work will include also the building of a tunnel five miles long at the foot of the Selkirk Mountains.

An agreement was recently arrived at between the city council of St. Catharines and the Canadian Northern Railway whereby the latter has agreed to build its main double track line between Toronto and the Niagara River through the central portion of St. Catherines and erect an up-to-date station in the main section of the city. The company also agrees to build a viaduct across the old Welland Canal. The city is to grant a bonus of $100,000.

A deputation recently waited on Mr. Spaidal, general superintendent of the Canadian Northern Quebec Railway Company, in connection with the running of a railway line between St. Casimir and St. Raymond. The railway would be about 23 miles in length and would serve the mills and water powers of the Deschambault Electric Company, and several saw and pulp mills. The Canadian Northern Quebec Railway Company promised to give their due consideration to this request.

Forty-five Millions in Public Works Under Way at St. John, N. B.

Recent developments in the constructional field at New Brunswick's capital are worthy of note. The public works now under way in St. John and the immediate vicinity involve an expenditure of $45,000,000, and private enterprise will be responsible for many millions more. A number of new undertakings are contemplated. It is stated on the authority of a director of the company which is developing the natural gas wells in Albert County that natural gas will be piped to St. John before the end of the year. In 1913, also, the New Brunswick Hydro-Electric Company [illegible] make a large expenditure in connection with its project to provide another source of light, heat and power. A number of new buildings are to be erected by the banks this season. The Bank of British North America will erect a large new building, the Royal Bank will erect a branch building in the north end of the city, and the Merchants Bank and the Quebec Bank will completely remodel buildings that they have purchased in the financial district. In connection with the scheme to reclaim [illegible] the south end of the city, for industrial purposes, it is interesting to note that a number of companies [illegible]

Messrs. T. McAvity & Sons are prepared to erect a group of thirty buildings and give employment to one thousand hands in the iron and brass industry.

Re-Organization of Engineering Department at Montreal

Mr. G. Janin, chief engineer of the city of Montreal, has submitted a scheme for the reorganization of the city's public works department, which has been approved by the Controllers. Under this, the street cleaning department and repairs to pavements, sidewalks, and macadam roads will be in charge of a new official to be called a general superintendent. Mr. Janin also recommends the city be divided into three sections with an engineer in charge, having under his orders assistant engineers and foremen, responsible for all new work on street pavements, sidewalks, and macadam roads. The present staff will be strengthened by the appointment of the head engineer. The offices of the staff will be in the shops of each division. The appointment of another new engineer to have charge of bridges, tunnels, and level crossings is recommended, and this official will be an expert witness to appear before the Railway Commission and other bodies on all matters relating to his department. A third engineer is to be named for the water department. For the sewers department, Mr. Janin divides the city into three sections, to be under the orders of an engineer in charge. Mr. Janin also announces that the Building Inspector's department needs re-organization, the details of which he will submit at a later date. The Chief Engineer proposes to have three conferences a week with his large staff at the City Hall, at which the best means for practical co-operation will be discussed and carried out.

G.T.R. Ontario Appointments

Considerable reorganization of the Grand Trunk staff in Ontario was disclosed in a statement issued recently by the company. Mr. G. A. Mitchell, formerly master of bridges and buildings, is now superintendent of bridges and buildings. Each division will have a master of bridges and buildings, who will report to Mr. Mitchell. Mr. E. G. Hewson, who was resident engineer, is now divisional engineer over the Ontario lines. There will be resident engineers appointed for each division, who will be under Mr. Hewson. Mr. H. Ferguson, formerly general road master of the middle division, is now superintendent of tracks over the Ontario lines. The general offices of general roadmaster, master of bridges and buildings, and resident engineer are abolished. Mr. S. L. Trussler is appointed train master over Ontario lines, with headquarters in Toronto. Mr. D. McCoe, who was superintendent of grade separation at Toronto, is now superintendent of track for Toronto terminals. All these officials will, as in the past, have their headquarters in Toronto.

At a meeting in Montreal, attended by representatives of local authorities, it was decided to petition the Federal and Provincial Governments to construct two bridges, one from St. Anne de Bellvue to Ile Perrot, and another from Ile Perrot to Vaudreuil, so as to connect the Island of Montreal with the mainland and establish a highway connection between Montreal and Toronto. A deputation from Charlemagne and Repentigny asked the Government to build a [illegible] between Charlemagne and Repentigny [illegible] they are now practically isolated from the mainland, while the Government have received a further request from a deputation [illegible] highway tapping the King Edward Boulevard at Lacolle and going east as far as Knowlton

Mainly Constructional

The News in Brief—From Coast to Coast

In March next the Dominion Steel Corporation will have [illegible] mill for rolling bars and small sections.

[illegible] completed for the new municipal abattoir [illegible] by the city of Toronto. The cost will be [illegible]

After [illegible] the mechanical filter works in Montreal, [illegible] have decided to install a similar plant in that city.

The city of Toronto has decided to do the paving of the [illegible] in [illegible] Park by the day labor system. The cost will be $45,000.

A new building record is expected in Regina, in 1913. Provision has been made for an increase in the permit fees, which will be based upon the amount of building work done.

The members of the provincial builders' exchanges will meet in Edmonton on February 19th, and the conference will last for a few days. Several important matters are expected to be brought up for discussion.

Another petition will likely be presented to the Government early in the Spring, asking them to reduce the duty on cement, from 53½ cents a barrel to 26 cents a barrel. The petition is said to be signed by a large number of contractors and consumers throughout the Canadian prairie west.

The report of the Winnipeg City Planning Commission has recently been issued and gives an exhaustive resume of their work since its organization at the end of 1911. The three main objects of the Commission are health, convenience and beauty.

Messrs. Byers & Anglin, contractors, Montreal, have just completed the purchase of a large tract of land above Outremont, containing about 320,000 square feet. The property will be used for a terminal of the tracks of the firm and for yards.

Mr. G. Janin, chief engineer of the city of Montreal, has prepared plans and specifications for a paving programme estimated to cost $3,500,000. This only covers a radius of within two miles of the City Hall. The Controllers will have to decide what portion of the work will be carried out this year.

The Cement Era, Chicago, have favored us with a copy of their annual Directory of Manufacturers of Cement, Gypsum and Lime. By the aid of this useful little book any prospective purchaser of these products may locate at a glance any nearby mill. A complete list of machinery and supply manufacturers is also given. This directory is issued annually. The price is $1.

A civic delegation from Toronto, headed by the Mayor, have visited Montreal and inspected the filtration plant of the Montreal Water & Power Company. The delegation desired information on certain points in view of the scheme for improving Toronto's water supply. The visitors were entertained at luncheon after a visit to the waterworks.

The Montreal Tramways Company are adding to their equipment at the Central Station, William street. a 2,000 kv.a. synchronous motor, with a 1,500 kw., 600 volt direct connected generator. The Canadian Westinghouse Company will supply the machines. The Tramways company will also install a 15-ton mono-rail hoist, supplied by John Millen & Son, Limited, Montreal, for handling the machinery and for repair work.

From the Erie Machine Shops, Erie, Pa., we have received an unique souvenir in the form of a brass model of the company's "Twentieth Century" road roller. This interesting model will not only be found useful as a paperweight, but it will serve as a continual reminder of the excellent workmanship of the company's products. Canadian readers will undoubtedly be well advised to obtain full information and quotations on the "Twentieth Century" roller.

Mr. Louis M. Epstein has practically completed negotiations which will enable him to proceed with his scheme of building one hundred houses in Medicine Hat to relieve the conjestion which is now felt there. The scheme is a very comprehensive one, allowing payment to be extended over a period of twenty years, but the purchaser can obtain possession at the time of the first payment. It provides that should the house-holder die any time during the twenty years, his widow will obtain full possession of the house without further payments.

After considerable discussion the city council of Toronto decided to limit the height of buildings in the city to 250 feet. In this conection it is interesting to note what regulations are in force in other cities on this continent. San Francisco and Pittsburg have no limit. Boston's limit is 125 feet. Chicago and Cleveland 200 feet. Philadelphia, while having no limit at present, is considering the advisability of establishing one. Buffalo will allow no building to be erected the height of which is more than four times the average of its least horizontal dimensions.

Vitrified Clays, Limited, has been duly incorporated to handle the products of the American Sewer Pipe Company in northwestern Canada and the northwest and Pacific States. The head offices of the new company are located in the Burns Building, Calgary. They will give special attention to sewer pipe and the patented segment sewer blocks, a product recently put on the market by the American Sewer Pipe Company. The Vice-President and General Manager of the new company is Mr. A. H. Stowell, who is well known to the engineers, contractors and municipal authorities of Canada. He formerly covered this territory for the American Sewer Pipe Company.

Practically $200,000,000 was recently voted by the Dominion Government for estimates for 1913. Some of the most important items were:—$19,000,000 for the National Transcontinental Railway; $4,500,000 for the construction ot the Hudson Bay Railway; $7,000,000 for the Intercolonial Railway; $3,000,000 for the Quebec bridge; $2,000,000 for the Welland ship canal; $2,000,000 for the new departmental buildings at Ottawa; $1,000,000 for a car ferry to Prince Edward Island; $2,600,000 for St. John Harbor; $2,000,000 for Port Arthur and Fort William Harbors, $1,500,000 for Quebec Harbor; $1,000,000 for the new Dominion Government building at London, Eng.; $1,000,000 for the new Levis drydock, and $500,000 each for Toronto, Vancouver and Victoria Harbors and for the French River improvements.

It is interesting to note that the Pittsburg and Lake Erie Railroad bridge over the Ohio river at Beaver, Pa., which weighs something like sixteen thousand tons, was cleaned and painted with Carbonizing Coating in 1911. All the surfaces were cleaned and 85 per cent. of the entire surface received a touch-up coat of paint, the entire surface thereafter receiving two full coats of paint. The cost of the coating gives a cost per coat per ton of 12¼ cents. The amount of material treated was 15,500 tons and the labor consumed in the cleaning of the material and the application of the coating was approximately 27,000 hours. At the present time the price of Carbonizing Coating is $1.25 a gallon in barrels to large contractors. This is fifty cents a gallon less than the cost to the railway company on the Ohio river bridge.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Belleville, Ont.

16,000 sq. yds. asphalt pavement, cost $32,000, Front street, planned by city council. Mayor, J. F. Wills. K. C. Chairman of Public Works, R. White.

Edmonton, Alta.

Plank walk and crossing construction, approximately 20 miles, planned by city commissioners. City engineer, A. J. Latornell. Plans, specifications, etc., at office of city engineer. Tenders received until February 15th, 1913.

Hamilton, Ont.

Asphalt plant, Barton street, contemplated by the City Council. Mayor, John Allan. Sec. Works Dept., W. C. Brennan, City Hall.

Ottawa, Ont.

Sewers contemplated by City Council on Kent street, 1,500 lin. ft. 24-in. 18-in., 15-in. and 12-in. pipe, to cost $9,000. Sewer on Keefer street to cost $5,000.

Pavement, approximately 3 miles, Trinidad Pitch Lake Asphalt, planned by city council. Mayor, J. E. Ellis. Works controller, J. W. Nelson. Acting city engineer, F. O. Askwith.

Cast iron pipe required by city council. Acting city engineer, F. C. Askwith. City Hall. Tenders close with Chairman Board of Control February 13th. 19,680 lineal ft. cast iron pipe. Specifications at office of City Engineer. City Hall, and MacLean Daily Reports, Toronto.

Supply of 127 valves and 50 hydrants required by city council. Engineer, R. H. Parsons, City Hall. Tenders close with Chairman Board of Control February 13th. Specifications at office of City Engineer, City Hall, and MacLean Daily Reports, Toronto.

Perth, Ont.

Macadam roadways, cost $20,000, contemplated by the town council. Clerk, John A. Kerr.

Stratford, Ont.

Nine-inch sewers on King and Cobourg streets are planned by City Council. Clerk, R. R. Lang.

Sutherland, Sask.

Hydrants, valves, etc., required by town council. Engineer, McArthur, Murphy & Underwood, Bottomley Block, Saskatoon. Tender K. for 30 fire hydrants, 52 gate valves and one automatic air relief valve. Plans, specifications, etc., at office of engineer. Tenders received by Secretary-Treasurer, Sydney Appleby, until February 24th, 191 .

Concrete sidewalks. Secretary-Treasurer, Sydney Appleby. Engineer, McArthur, Murphy & Underwood. Bottomley Block, Saskatoon. Tender I. Construction of approximately 62,00 sq. ft. of concrete sidewalks and 1,670 lin. ft. of curb. Plans, specifications, etc., at office of engineer. Tenders received by Sec.-Treas. until February 42th, 1913.

Vancouver, B.C.

Water pipe supply of 5,280 lin. ft. of 2-in. galv. iron pipe with unions; 107,000 lin. ft. of 4-in. No. 8 lapwelded or weldless steel pipe; 50,000 lin. ft. of 8-in. No. 7 lapwelded or weldless steel pipe. Specifications, etc., at office of Clerk, who receives tenders until March 5, 191 .

Village, De Courville, Que.

Waterworks system planned by Municipal Council. Sec.-Treas., Alfred Brousseau. Engineers, Joncas, Tremblay & Malouin, Banque Nationale Bldg., St. Roche, Que. General contractor, George Madden, St. Peter street, Quebec.

Winnipeg, Man.

The Board of Control have instructed city engineer to proceed at once with the sinking of six more test wells for waterworks system Nos. 16 to 21 inclusive. Secretary, M. Peterson. Engineer, H. N. Ruttan, 223 James avenue.

CONTRACTS AWARDED

Galt, Ont.

Extension of waterworks system, cost $15,000, planned by the Council. Mayor, Stewart Scott. Clerk, Jos. McCartney. Work to be done by the town.

Montreal. Que.

Cast iron pipes. Board of Commissioners, City Hall. Secretary, L. N. Senecal. Engineer in charge, Geo. Janin. General contractors, R. G. Wood & Company, Philadelphia, Pa. 8,130 tons cast iron water pipes.

Stratford, Ont.

Pavements, cost $5,400, Tarvia and Westrumite, on all streets. Clerk, R. R. Lang. Engineer Ferguson in charge.

Village De Courville, Que.

Drainage. Sec.-treas., Alfred Brousseau. Engineers, Joncas, Tremblay & Malouin, Banque Nationale Bldg., St. Roche, Que. General contractor, Geo. Madden, St. Peter street, Quebec.

Railroads, Bridges and Wharves

Brandon, Man.

The Brandon Street Railway [illegible] will be extended as far as the Dominion Experimental farm in the north-west part of the city. Clerk, [illegible]

Chatham, Ont.

Three bridges planned by City Council on Adelaide street over Indian Creek and at cemetery. Steel and cement construction. Clerk, W. G. Merritt

Cobourg, Ont.

C. L. O. & W. Rly., C. P. R. Co. has been authorized to construct bridge [illegible] 120,4 over creek near Cobourg, Twp. Hamilton, Ont.

District of Algoma, Ont.

C. N. O. Rly. Co. have been authorized to construct bridge over Dishnish Creek, District of Algoma, Ont., at mileage 257 from Sudbury Junction.

Hamilton, Ont.

The Hamilton Street Rly. Co., are planning extension in the east end. Five miles extensions, 70-lb. rails. Engineer in charge, E. P. Coleman, Terminal Station.

Innisville, Ont.

Steel bridge, Lanark County, cost $15,000, planned by City Council. Chairman Committee, Alex. McAllister, Carleton Place. Engineer in charge, B. G. Nichol, Carleton Place. Tenders will be called.

Bridge, etc., River Mississippi. County clerk, E. R. Stedman, Perth. Acting engineer, B. G. Michel, High street, Carleton Place. Tenders received by clerk until February 15th, for erection of steel bridge, and also for five concrete piers and two abutments for same. Plans and specifications at office of clerk and engineer.

London, Ont.

The London Street Railway plan double tracking in several parts of city, 80-lb. rails, frogs, etc., required. Manager, C. B. King.

Le Pas, Man.

The Dom. Govt. Dept. of Public Works will spend $50,000 in dredging the Pas River and building suitable docks, etc. Secretary, R. C. Desrochers, Ottawa.

Province of Manitoba

The Lake Winnipeg and Nelson River Rly. Co. will apply for charter for railroad from upper end of Lake Winnipeg. Interested, Hugh G. Holman, architect, [illegible] Jordan Building, Winnipeg.

Province of Ontario

C. N. O. Rly. Co. has been authorized to construct 4 bridges; namely, over west branch of Beaver River, Dist. Algoma, mileage 211.3 from Sudbury Junction, over Conklin River, Dist. Algoma, mileage 232.8 from Sudbury Junction, over [illegible] River [illegible], Dist. Algoma, mileage 171.7 from Sudbury Junction, and across Macaming River, west crossing, Dist. Sudbury, at mileage 109 from Sudbury Junction.

Province of Quebec

Railroad for the Central Railway Co of Canada planned, location of line from mileage 5 to 16, Quebec, has been approved.

Ottawa, Ont.

The Ottawa Morrisburg Electric Rly., plan the construction of railway between Ottawa and Morrisburg. Work to start in spring. President, J. G. Kilt, Citizen

Building. Engineer in charge, Company's engineer, Canada Life Building.

Extensions are planned for the Ottawa Electric Railway Company. Slater street. President. Mr. Ahearn. Secretary. Mr. Fraser. Engineer in charge, Supt. Burpee, Slater street. Work to start in spring. Approximately 3 miles, 75-lb. rails, gauge 4 ft. 10½ ins.

Car shops and sheds planned for Ottawa-Morrisburg Electric Railway, Canada Lift Building. President, J. G. Kilt, Citizen Building. By-law has been passed. Construction of tracks to start in spring.

Rainy River District, Ont.

[illegible] Rly. Co. has been authorized to construct bridge across the Seine River. Dist. Rainy River, Ont., at mileage 173 7. to replace existing bridge.

Strathroy, Ont.

Railroad. G. T. R. Co. will relay rails between Strathroy and Windsor with [illegible]. Work to start in spring. Superintendent, Davidson, London.

Toronto, Ont.

Canadian Pacific Railway Company will double track its line from Toronto to Guelph Junction in the spring, about 30 miles to be done.

West London, Ont.

Bridge, Wharncliffe Road, planned by City Council. City Engineer, W. H. Brazier. Tenders received have been cancelled, a larger bridge is now contemplated and new tenders will be called for a structure 320 ft. x 23 ft., cement and steel construction.

Winnipeg, Man.

Railroad buildings planned for C. P. Ry. Specifications, plans, etc., at office of Division Engineer. Tenders received by Div. Engineer until Feb. 20, 1913, for erection of engine houses, section houses, frame stations, etc., on the Manitoba Division. Division Engineer, J. C. [illegible]

CONTRACTS AWARDED

Brandon, Man.

Bridges, over Assiniboine River, for G. T. P. Rly. General contractors, The Hyland Navigation & Trading Co., Bank of Hamilton Building, Winnipeg. The same company, received the contract for construction of railroad from Harte to [illegible]

Batiscan River, Que.

Two landing piers, cost $17,300, Dom. Govt., Dept. Public Works. Secretary, R. C. Desrochers, Ottawa. General contractor, Mr. Onesime Poliquin, Portneuf, Que.

Cobourg, Ont.

Extension to breakwater planned by Dom. Govt., Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. All tenders received were considered unsatisfactory. Work will be done by day labor.

Providence Bay, Ont.

Extension to wharf, cost $21,480, Manitoulin Island. Dom. Govt., Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractor, E. V. White, Burlington, Ont.

Provinces of Quebec and N. B.

Railroad for G. T. P. Ry. General contractors, M. P. & J. T. Davis, Quebec, Que. Sub-contractor, William Daly, 381 Querbes street, Montreal, Que. For the completion of 130 miles of railway construction, between New Brunswick and the St. Lawrence River. Work includes ballasting, laying rails and building bridges.

Province of Quebec

Railroad. C. P. Ry. have awarded contracts to Jones & Girouard, Montreal, for line from Timiskaming to Ville Marie, Quebec, about 30 miles.

Ste. Genevieve de Batiscan, Que.

Wharf, cost $7,289.05. Dom. Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Lauzon Engineering Company, Ltd., Levis, Que.

St. Peters Bay, P.E.I.

Repairs to wharf, cost $3,993. Dom. Govt., Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Annandale Lumber Co., Annandale, P.E.I.

Public Building, Churches, Schools, etc.

Ancaster. Ont.

Club house, cost $35,000, planned for Tammhac Club. Tenders received by Architects, Prack & Perrine, 38 James street south, Hamilton.

Belleville, Ont.

Public school, cost $50,000, Octavia St. Stone and cement foundation, brick and steel girders. Plans in progress. Sec.-Treas., W. J. Diamond.

Belmont. Ont.

School, cost $4,000. Architect, W. G. Murray, Dominion Savings Building, London, is preparing plans. One storey, 35 x 40, white brick construction, cement foundation.

Berlin, Ont.

School, cost $5,000 for St. Pauls Lutheran Church. Pastor, Rev. C. Zarnke, 67-69 Frederick street. One storey, white pressed brick construction, cement foundation. Plans will be prepared.

Calgary, Alta.

College, Meadowfield, for The R. C. Diocese. Architects, Laing & Smythe, Beveridge Block, are preparing plans.

Gretna, Man.

Public building, cost $15,000, planned by Dom. Govt. Dept. of Public Works., Secretary, R. C. Desrochers, Ottawa. Work will be started this year.

Kamsack, Sask.

School, cost $8,000. Sec.-Treas., Jno. Bowes. Architect, E. G. Sherwood, 3 Commonwealth Block, Winnipeg. Man. Two storeys and basement, 36 x 38, brick, stone foundation. Plans in progress.

Le Pas, Man.

Court house, etc., contemplated by Prov. Govt. Dept. of Public Works. Minister, Hon. Colin H. Campbell. Bill will be introduced to erect Judicial Buildings.

Lindsay, Ont.

School planned by Board of Education. Chairman, J. D. Flavelle. Two storeys, brick construction, stone foundation. Tenders will be called.

Langley Prairie, B.C.

School, Delta Electoral District. Provincial Govt., Dept. Public Works. Minister, Hon. Thos. Taylor, Victoria, B.C. Engineer, J. E. Griffith, Victoria. For erection and completion of a large one-room school house. Plans, specifications, etc., at Department, Victoria, and at office of S. A. Fletcher, Government Agent, New Westminster, and J. W. Berry, Secretary, Langley Prairie School Board. Tenders received by Minister until February 19, 1913.

London, Ont.

The city council plan to have the old town hall remodelled and fitted up as police station. Mayor, C. M. R. Graham.. Police chief, Williams.

Manitou, Man.

School, cost $25,000, for the Manitou School Board, Dist. No. 314. Architect not yet chosen. Two storeys, 85 x 56. Plans will be prepared and tenders called.

Mitchell, Ont.

Church, cost $7,000, St. David, for Lutheran congregation. Pastor, Thos. Bloedel. One storey and basement, 30 x 45. white and pressed brick construction, cut stone, stone and cement foundation. Plans in progress.

Montmorency, Que.

Commercial academy contemplated by the Catholic School Commissioners. Plans will be prepared.

Ottawa, Ont.

Public swimming baths planned by city council. Mayor, J. A. Ellis. Sec. Board of Control, N. H. H. Lett, City Hall. Acting city engineer, F. C. Askwith, City Hall.

Church for Methodist congregation. Building committee, T. H. Percival, 108 Argyle avenue, A. E. Shaver. 199 Patterson avenue, G. H. Hopper, 43 Third avenue, A. S. Wickware, 7 Powell street. Plans are to be prepared at an early date. Architect not yet chosen.

School, cost $140,000, Rosemount, 16 rooms. Crawford Ross, Secretary Public School Trustees. Architect, W. B. Garvock, Creighton street school, is preparing plans.

Owen Sound, Ont.

Opera house, cost $50,000, for Redmond & Beggs (in trust), Room 312 Kent Building, Toronto. One storey, brick foundation, stone, terra cotta, tile and brick structure, steel construction, felt and gravel roofing. Plans in progress.

Prince Albert, Sask.

Club rooms, gymnasium, etc., cost $30,000, contemplated by A. J. Manville. Three storeys, swimming tank, 75 x 30, shower baths, bowling alley, complete gymnasium equipment required. Plans will be prepared.

Quebec, Que.

Church, cost $75,000, Grande Allee, for Redemptorist Fathers, St. Stanislas St. Architect, Rene P. Lemay, 19 d'Aiguillon street, is preparing plans .

School, cost $65,000, 5-storeys, for Trustees of Laval University. Chancellor, most Rev. L. N. Bebin. The above building is an extension to the University for students in forestry and surveyors. Plans in progress.

Revelstoke, B. C.

Lodge rooms, hall, etc., cost $20,000. The I. O. O. F. has decided to have prepared plans, specifications, etc. Work will start in spring.

Swift Current, Sask.

Post office, cost $200,000, planned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Work will be commenced shortly.

Armory, cost $20,000, contemplated by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Plans will be prepared.

Toronto, Ont.

Addition to theatre, cost $10,000, 568-70 Bloor street west, for Motion Plays, Ltd., 16 Victoria street. Architect, A. J. Stringer, Kent Bldg. Structural steel, brick construction. Plans drawn.

Armory is contemplated by Dominion Government, Dept. of Militia and Defence for University of Toronto.

Theatre, cost $4,000, Dundas street, for J. Donnenfield, 164 Evelyn Avenue. Architect, T. A. Fleming, 94 Law street. One storey, 35 x 110, stone foundation, brick and structural steel. Plans ready.

Trenton, Ont.

Drill hall, 180 x 80, planned by Dom. Govt., Dept. of Militia & Defence. Sec. E. F. Jarvis, Ottawa.

Vancouver, B.C.

The First Congregationalists 1,100 Thurlow street, will erect church and Sunday School at Eleventh and Trafalgar street, in South Kitsilano.

Winnipeg, Man.

The Board of Control is considering erection of a number of public comfort stations throughout the city. Secretary, M. Peterson.

Public libraries contemplated by the Board of Control. Secretary M. Peterson. Mayor Deacon and Librarian J. H. McCarthy are investigating.

School, cost $8,000, planned for East Kildonan School Board. Sec.-Treas., H. Thompson, 215 Chambers of Commerce Building, Winnipeg. Architect, E. G. Sherwood, 3 Commonwealth Block, Winnipeg. Two storeys, 40 x 50, stone foundation, brick construction.

Windsor, Ont.

Police station contemplated by the city council police commission. Mayor, Henry Clay. Plans will be prepared.

CONTRACTS AWARDED

Montreal, Que.

School, cost $110,000, for School Commissioners of Municipality of Ste Madeleine d'Outremont. Architects, Viau & Venne, 76 St. Gabriel street, Montreal. General contractor, Ulric Boileau, Forsythe and Hogan, Montreal. Sub tenders received by General Contractor. Four storeys, cement foundation, reinforced concrete and pressed brick construction, felt and gravel roofing, marble finish.

Ste. Therese, Que.

Public building, cost $18,150. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, O. B. Lafleur & Fils, Ltd., Lachute, Que.

Vancouver, B.C.

Y.M.C.A., cost $350,000, Georgia and Burrard streets. Architects, H. S. Griffiths, Dominion Trust Building. General contractors, Booker, Campbell & Whipple, 413 Granville street. Eight storeys, reinforced concrete, structural steel and pressed brick construction. Headquarters address, 590 Cambie St.

Business Buildings and Industrial Plants

Berlin, Ont.

Clock factory on Frederick street, contemplated by the Arthur Pequenet Clock Co. Plans will be prepared.

Battleford, Sask.

Business block planned for S. L. White. Work will be started in the spring, as soon as weather permits.

Chelsea Green, Ont.

Factory for Richards Wilcox Hardware Co. Manager, Mr. Yendell, Aurora, Ill. Site purchased and plans will be prepared. Will require machinery for manufacturing special lines of small hardware.

Calgary, Alta.

Warehouse, cost $60,000, Eleventh avenue, 4-storeys, for Canadian Gen. Elec. Co., 325a Eighth avenue west. Architects, Hodgson, Bates & Beattie, Grain Exchange Building, are preparing plans.

Chatham, Ont.

Warehouse, cost $3,000, for M. R. Sidney Stephenson, 430 King street. Two storeys, 37 x 42, brick construction and foundation. Plans in progress.

Dauphin, Man.

Oil warehouse contemplated for The Canadian Oil Co., Levis street (Elmwood), Winnipeg, Man. Plans will be prepared.

East London, Ont.

Flour mill, cost $40,000, for T. Dexter, North Branch Mills, West London. General milling machinery required. Three storeys, 45 x 60, stone foundation, white brick construction. Plans in progress.

Elmira, Ont.

Addition to factory for Elmira Furniture Co., Ltd., Union street. President, Thos. Dillon. Manager, A. Steinke. Tenders received by Architect, C. Knechtel, Berlin, Ont., until February 20th, for masonry, carpentry, plumbing and painting. Plans and specifications with owners and architect. Three-stys., 100 x 50.

Gull Lake, Sask.

Departmental store, etc., Conrad Ave. Owned by S. G. A. Currie, Departmental Store, C. H. Morrison, drug store and several smaller stores burned. Damage to buildings and contents $75,000, partly insured.

Hamilton, Ont.

[illegible] 000, James street, for R. Phillips, 481 King street east. Architect, Jas. Bal[illegible] foundation, structural steel, pressed brick construction. Plans in progress.

Addition to factory, Napier street, for B. Greening Wire Co., Napier street. Architects, Prack & Perrine, 36 James street south, are preparing plans.

Kamloops, B.C.

[illegible] Victoria street, for The Kamloops Standard. Brick construction, site purchased and plans will be prepared.

London, Ont.

Bank building, cost [illegible] 180, Richmond street, for Royal Bank of Canada. Manager, F. E. Karn. Architect not yet chosen. Five-storey pressed and white brick and cut stone construction.

Warehouse planned for Ross, Ltd., 196 Dundas street. Tenders received by Architect, W. G. Murray, 111 Masonic Temple. Two storeys, 93 x 19 ft. 6 ins., brick foundation, white brick construction.

Montreal, Que.

Ink factory for the Carter's Ink Co., 356 St. Antoine street, Montreal. Plans are being prepared.

Minaki, Ont.

Sawmill planned for The Crossing Lumber Co., Ltd. Managing director, Frank R. Patriarche. To be built next fall.

Montmorency, Que.

Alterations to brick plant for The Citadel Brick & Paving Brick Co., Auditorium Building, Quebec. Plans will be prepared.

Extension to factory for Dom. Textile Co., planned to contain 1,200 new looms.

Montreal, Que.

Extension and addition to factory, cost $8,000, for Liquid Air Co., Premiere avenue. Tenders received by Architects, Viau & Venne, 76 St. Gabriel street. One storey addition, cement foundation, solid brick construction, felt and gravel roofing.

Moose Jaw, Sask.

Business building, cost $5,000, for The Moose Jaw Tent & Mattress Co. Plans will be prepared and building erected this year.

Orillia, Ont.

Smelting plant. The Can. Refining & Smelting Co. Manager, C. Holding. Plans to replace building recently destroyed fire to have double capacity of old plant will require: cement, lumber, concrete mixer, transmission machinery, dynamos, motors, filter presses, jigs, grizzlies, furnaces, conveyors, steam engines and boilers, brick steel tanks and stacks, general mill and smelting equipment 4 triplex or 5 ball valve pumps about 5 x 7, crushing machinery, tanks, piping.

Ottawa, Ont.

Business building, 10 storeys, Queen street, for Wallace Realty Co. President, Frank Ahearn, 56 Sparks street. Sec.-Treas., James D. Fraser, 451 Albert street. Plans prepared.

Garage, cost $4,500, for Dr. J. E. Taggart, 36½ Rideau, 38 x 80, solid brick construction, cement foundation. Plans in progress.

Port Stanley, Ont.

[illegible] for Dr. J. W. Nettleton. White brick construction. Plans in progress.

Prince Albert, Sask.

[illegible]

Sarnia, Ont.

Gate factory, cost $8,000, for Regal Gate Co. [illegible] storey, 110 x [illegible], cement foundation, [illegible] construction. Plans will be prepared.

Sackville, N.B.

[illegible] Tenders received by Architect, J. W.

[illegible] from [illegible] 15th to 28th. Two storeys, [illegible], stone foundation, stone and [illegible] construction, store fixtures and fronts.

St. Catharines, Ont.
[illegible] contemplated by [illegible] Co. [illegible] City has [illegible] will shortly be [illegible]

St. John, N.B.
Warehouse, [illegible] William and Water streets for Vassie & Co., dry goods. [illegible] W. F. Foster. [illegible]

St. Thomas, Ont.
Factory, cost $[illegible], for Thomas Bros., Mfg. brushes, brooms, etc. Manager, E. H. Thomas. Architect to be chosen shortly. Three storeys, 120 x [illegible] white brick construction, stone and cement foundation, felt and gravel.

Saskatoon, Sask.
Tile factory planned for The S. & S. Non-breakable Hollow Building Tile Co. Plant will be erected in spring.

Schumacher, Ont.
Refinery contemplated for The Pearl Lake Gold Mines, Ltd. Manager Col. C. W. Stevenson. Plans will be prepared.

Toronto, Ont.
Garage, cost $4,000, for C. Kean, Peter and King streets. Architect, C. J. Read, Confederation Life Building. One storey, 20 x 26, cement and brick foundation, brick construction. Plans drawn.

Bank building, Church and Wilton avenue, for Sterling Bank of Canada, King and Bay streets. Plans will be prepared.

Three attached stores and residence, cost $6,000, Danforth avenue, for Tickner & Sutherland, 82 Victoria street. Architect, P. H. Finney, 79 Adelaide St. east. Two storeys, brick and structural steel construction, brick foundation, felt and gravel roofing. Plans drawn.

Store and office, cost $10,000, Yonge and Hayden streets, for S. Frank Wilson, 15 Toronto street. Architects, Symons & Rea, 15 Toronto street. Three storeys, 42 x 220, brick foundation, structural steel, reinforced concrete construction. Plans drawn.

Warehouse, 5-storeys, Queen and Portland streets, contemplated by Messrs. Hyman, Simon & Henry Franklin. Plans will be prepared.

Victoria, B.C.
Warehouse, cost $30,000, Store and Cormorant streets, for Scott & Peden, 1409 Store street. Architect, M. S. Farwell, 415 Sayward Bldg. Tenders will be called by architect about February 20.

The B.C. Elec. Rly Co., 425 Carrall street, Vancouver, will erect modern 10-storey office building and station, near Pandora and Douglas streets.

Winnipeg, Man.
Whitewear factory. The T. Eaton Company, Limited, Toronto and Winnipeg, will build 3-storey addition to present building.

West Lorne, Ont.
Bank building, cost, $5,200, for Merchants Bank of Canada, head office Montreal. Manager, W. O. Nicol. Two storeys, 30 x 45, cement and stone foundation, white brick construction. Plans in progress.

Waterloo, Ont.
Planing mill, cost $20,000, for Reitzel Bros., Foundry street. One storey, 126 x 66, cement foundation, reinforced concrete construction. Plans in progress.

Zurich, Ont.
Addition to clothing factory planned for The Jackson Mfg. Co. Manager, Thos. Jackson. Will require new electric machinery, electric lighting equipment, etc.

CONTRACTS AWARDED

Bridgeburg, Ont.
Planing mills, cost $8,000, Eric street. Architect and builder, Oscar Teal, Dufferin street. Two storeys, 80 x 48, pine floors. Foundations in.

Calgary, Alta.
Store, cost $5,000, for C. Sing, 215 12th ave. E. Gen. contr and builder, J. Taylor, 113 Eleventh avenue east. Two storeys, 50 x 90, cement foundation, brick construction. Excavating started.

Hamilton, Ont.
Factory, cost $25,000, East end, for Steel Co. of Canada, Ltd., Sherman avenue north. Architects, Prack & Perrine, 36 James street south. General contractors, H. G. Christman & Company, Main and Hughson streets. Iron and steel, Hamilton Bridge Works Co., Barton and Bay streets.

Addition to factory, cost $14,000, for Laidlaw-Bale Tie Co., 4 Adams streets. Builder and general contractor, Geo. E. Mills, 614 King street east. Carpenter, Geo. White, 165 Main street east. 2½-storeys, 100 x 80, cement foundation, reinforced concrete, brick and structural steel construction.

Remodelling stores and apartments, cost $9,000, for Thos. W. Watkins, 252 Park street south. Architect, A. W. Peene, Clyde Block. General contractor, H. C. German, 15 Tuckett street. One storey addition, brick and structural steel construction.

Warehouse, cost $15,000, Ferguson avenue, for Dixon Bros., 66 King street east. Architect, W. A. Edwards, 2 Hughson street south. Corpenter, R. A. Campbell, 117 Duke street. Three stys. and basement. Foundations in.

Longue Point, Que.
Warehouse, cost $30,000, for Canadian Tube & Iron Co., Victoria avenue, Emard Ward, Montreal. Architects and general contractors, Jas. Shearer Co., Ltd., 225 St. Patrick street, Montreal. One storey brick construction, cement foundation, felt and gravel roofing.

Montreal, Que.
Factory, cost $7,000, for Ed. Cartier, 107 Lagauchetiere street. Builder and general contractors, R. E. Edwards & Sons, 200 Versailles street. One sty. addition, 70 x 70, solid brick construction, felt and gravel roofing.

Stables, cost $14,000, Victoria avenue, Westmount, for W. W. Butler, Transportation Building, Montreal. Architect, Robt. Findlay, 10 Phililps Place, Montreal. General contractor, W. S. Robertson, 13 Cartier Building, McGill street, Montreal. Sub tenders received by General Contractor for plumbing, heating and electric lighting.

Factory for Canadian Bag Co., 492 William street. Architects, Ross & MacDonald, 1 Belmont street. General contractors, C. E. Deakin, 11 St. Sacrament street. Sub tenders received by General Contractor. Two storeys, cement foundation, reinforced concrete and brick construction.

Factory, St. Henri, for Alaska Feather & Down Co., 412 St. Ambroise street. Architect and general contractor, James Shearer Co., Ltd., 225 St. Patrick street. Two storeys, brick construction, cement foundation, felt and gravel roofing. Foundations in.

Quebec, Que.
Store and residence, cost $3,000, for Abias A. Cantin, St. Valier street. Architect and general contractor, F. X. Blouin, Nelson street. Three storeys, 50 x 70, stone foundation, brick and wood construction. Excavation done.

St. Thomas, Ont.
Shoe factory, cost $40,000, Talbot St., of The E. T. Wright Shoe Co. Manager, E. E. Donovan. Architects, Watt & Blackwell, Bank of Toronto Building, London. General contractor, A. E. Ponsford, 605 Talbot street. Sprinkler system, General Fire Equipment Co., 72 Queen street east, Toronto. Four stys., 150 x 45, office equipment, machinery.

Vancouver, B.C.
Hotel, cost $150,000, Richards street, for T. D. Hyndman, 1220 Barclay street. Architect, Emil Guenther, 404 North West Trust Bldg. General contractor, E. J. Ryan, 768 Granville street. Plumbing and heating, Barr & Anderson, 1060 Homer street. Roofing, sheet metal and cornices, Western Sheet Metal Works, 1253 Howe street. Electrical work, the Electrical Construction Co., 544 Howe street. Seven storeys, reinforced concrete construction, pressed brick and terra cotta facing.

Residences

Kingsville, Ont.
Bungalow, cost $3,500, Queen, for Del. Bertrand. 1½-storey, frame construction, cut stone, stone and cement foundation. Plans in progress.

Lambeth, Ont.
Residence, cost $5,500, for Jas. Kelly, architect and builder. Two storeys, 35 x 45, stone and cement foundation, pressed brick construction. Plans in progress.

Lindsay, Ont.
Residence, cost $3,500, for Mrs. M. E. Mullen, Box 26. Brick, stone foundation. Plans in progress.

Residence, cost $4,000, for Dr. H. Irvine, Peel street. Brick, stone foundation. Plans in progress.

Montreal, Que.
Residence, cost $12,000, Gouin Blvd., for Hector Paremont, 128 St. Peter. Architect, Keith's Minneapolis, Minn., U. S. A. Two storeys, 46 x 40, pressed brick construction, cement foundation, garage. Plans drawn.

Notre Dame Des Victoires, Que.
Residence, cost $20,000, for Parish Priest, Notre Dame des Victoires. Architects, Viau & Venne, 76 St. Gabriel, Montreal. Tenders received by owner after February 20th. 2½ storeys, 40 x 60, cement foundation, brick construction.

New Westminster, B.C.
Forty-four residences for Dr. M. F. Keeley et al, 736 Granville street, Van-

couver. Architect, M. L. Taylor, 20, Hastings street west, Vancouver. Bldgs. to cost from $1,500 to $2,000 each, to be erected near the Great Northern Depot. Tenders will be called about Feb. 28th, 1913. Architect is preparing plans.

Poole's Resort, Ont.
Residence, cost $10,000, for John W. Butler, New York. Architect, Stuart Allaster, Brockville. Three storeys, 75 x 30, stone foundation, frame construction. Plans drawn.

Toronto, Ont.
Residence, cost $6,000, Clinton street, for J. Donnenfield, 164 Evelyn ave. Architect, T. A. Fleming, 94 Laws street. Two storeys, 32 x 72, brick foundation, brick construction. Plans drawn.

Residence, cost $5,000, Rusholme Rd., for S. Shaver, 402 Dovercourt Road. Architect, Len. Foulds, 21 Leader Lane. Tenders received by owner. Brick construction and foundation.

Apartment, cost $10,000, Hazleton and Davenport, for W. B. Charlton, 140 Close ave. Architect, E. G. Wilson, 70 Victoria street. Three storeys, 34 x 76, brick foundation, brick construction. Plans drawn.

Vancouver, B.C.
Apartments, cost $50,000, S.E. corner Albert and Vernon Drive, for H. S. Rowling, 1506 11th ave. east. Architects, Stuart & White, 837 Hastings street W. Five storeys, 50 x 77, brick and concrete construction. Plans prepared.

Winnipeg, Man.
Residence, cost $6,000. Architect, Edgar Prain, 313 Fort street, is preparing plans. Two storeys, 30 x 35, stone foundation, frame construction.

CONTRACTS AWARDED

Brantford, Ont.
Residence, Victoria street. Owner & builder, J. W. Smith, Brantford. One and a half storeys, 18 x 26, cement fndn pressed brick construction.

Calgary, Alta.
Residence, addition, cost $5,000, Harvetta Heights, for F. D. Beveridge. Builder, J. H. Henderson, Beveridge Block. Two storeys, 30 x 30. Excavating done.

Two residences, cost $5,000, Elbow Park, for Archer & Robertson, Dominion Bank Bldg. General contractor, W. L. McLam, Bankview. Two storeys, 22 x 40, cement foundation, frame construction.

Hamilton, Ont.
Eight residences, cost $19,200, Fairleigh ave. Builders and general contractors, Seymour & McKay, 10 Augusta ave. 2½ storeys, stone and cement foundation, pressed brick construction.

Twelve residences, cost $22,000, Fairleigh Cres. Seymour & McKay, 10 Augusta street, builders and general contractors. Two and a half storeys, pressed brick construction, stone foundation.

Kingsville, Ont.
Residence, cost $3,200. Owner and builder, Andrew Gorman. 1½ storeys, 25 x 38, white brick construction, cement and stone foundation.

Residence, cost $4,000, Division street. Owners and builders, Cascadden Bros. Two storeys, 28 x 40, stone and cement foundation, white brick construction. Foundations in.

Lachine Rapids, Que.
Six residences. Owner and builder, D. Dunn. Three storeys, 50 x 74, cement foundation, brick construction, felt and gravel roofing.

Lambeth, Ont.
Residence, cost $3,200, for Fred Boyes. General contractor, J. Currie. Two storeys, stone and cement foundation, white brick construction.

Londin, Ont.
Residence, cost $4,000. Owner and biulder, Benjamin Parkinson, c/o London Free Press. 1½ storeys, 25 x 40, white brick construction, stone and cement foundation.

Montreal, Que.
Residence, cost $4,000, Chambly street. Architect and builder, Madame Edward Noel, 64 Dufresne. Three storeys, 25 x 45, cement foundation, solid brick construction.

Four residences, cost $10,000, William street. Architect and builder, A. Lachapelle, 322 William street. Three stys., 72 x 48, cement foundation, brick construction, felt and gravel roofing.

Six flats, cost $5,000, Church street. Owner and builder, Louis Beanger, 456 Church street. Three storeys, 25 x 50, cement foundation, brick construction, felt and gravel roofing. Foundations in.

Residence. Owner and builder, Walter Warlow, 3691 Boyer street. One storey, 25 x 34, brick construction, stone foundation.

Five flats, Verdun, 4480 Rielle, for Ferdinand Martel, 3800 Lasalle street. Builder, M. Cazeau, 107 Lasalle street. Three storeys, 35 x 40, cement foundation, brick construction, felt and gravel roofing. Foundations in.

Residence, cost $10,000, for T. B. Macauley, 4007 Dorchester street. Architect, Robert Findlay, 10 Phillips Place. General contractors, Robertson Bros., 13 Cartier Bldg., McGill street. Carpentry, Simpson & Peel, 10 Benoit St. Iron and steel, Dominion Bridge Company, Lachine. Painting, heating, plumbing and electrical work not yet awarded.

Two residences, cost $7,000. Architect and builder, E. H. Madore, 2550 Notre Dame west. Three storeys, 23 x 55, stone foundation, solid brick construction, felt and gravel roofing.

Ottawa, Ont.
Residence, cost $7,500, Carling street, for W. D. Hooper, 162 Clemow street. Architect, H. J. Hopper, 33 Linden Terrace. General contractors, Hopper Bros. Linden Terrace. 32 x 34, brick veneer construction. Foundations in.

Residence, cost $4,500. Owner and general contractor, Willis Loucks, 194 Sunnyside. 33 x 35, stone foundation, double brick veneer construction.

Port Stanley, Ont.
Residence, cost $3,200. Owner and builder, F. Morgan. 1½ storeys, 28 x 40, pressed brick construction, cement and stone foundation.

Ridgetown, Ont.
Residence, cost $4,000, Harold street. Owner and builder, John Coulson, Palmyra, Ont. 1½ storeys, stone and cement foundation, white brick construction.

Shakespeare, Ont.
Residence, cost $3,000. Architect and builder, John Riddell. Cement foundation, white brick construction.

Toronto, Ont.
Two pair residences, cost $8,000, Fulton avenue, for Catherine Lucas. Architect and builder, C. Lucas, 29 West ave. Brick foundation and construction.

Three pair residences, cost $12,000, Davenport road. Architects and builders, Davidson & Co., 53 Canada Life Bldg. Stone foundation, brick construction, felt and gravel roofing.

Two detached residences, cost $8,000, Glencairn. Architect and builder, J. M. Jeffreys, 328 Mount Pleasant Road. 2½ storeys, 25 x 40, brick foundation and construction.

Pair residences, cost $5,000, Rosemount. Architects and builders, Haywood & Whitehorn, 6 Hallam street. 2½ storeys, 45 x 36, stone foundation, brick construction.

Wingham, Ont.
Residence, cost $3,500. Architect and builder, W. Dodd. Two storeys, 25 x 35, white brick construction, stone and cement foundation.

Winnipeg, Man.
Residence, cost $3,500, Fleet street. Architects and general contractors, Gillis & Fraser. Two storeys, 20 x 24, frame, stone foundation. Excavating done.

Power Plants, Electricity and Telephones

Bruce County, Ont.
Power machinery required by County Council. Warden, S. R. Bell, Teeswater. The development of power on the Saugeen River is contemplated.

Chatham, Ont.
The City Council plan to instal hydro electric system. Mayor, A. I. Dunn. Equipment required.

Ottawa, Ont.
Transformers, meters and general electrical supplies required by City Council. Mayor, J. A. Ellis. Engineer, J. E. Brown, Superintendent Electrical Department, City Hall. Tenders will be called in about two weeks.

Legislation will be asked to allow city to issue debentures for $150,000 for changing present electric plant from two-phase to three-phase. Mayor, J. E. Ellis. Secretary Electric Commission. Engineer in charge, Supt. Brown, City Hall.

The City Council, Electrical Department, are contemplating the purchase of incandescent electric lamps. Tenders to be called shortly. Engineer, J. E. Brown, Supt., City Hall.

Street lighting ¼ mile, ornamental iron standards and cluster of five lights. Mayor, J. A. Ellis, Sec. Elec. Commission. Engineer in charge, Supt. Brown, City Hall.

Springbank, Ont.
Alterations to power house. The city of London plan [illegible] power house to power house [illegible] generators to be operated [illegible]

(Continued on page 80)

Tenders and For Sale Department

TENDERS
FOR
Cast Iron Pipe

[illegible] registered post [illegible] of the Board [illegible] Canada, up to noon on **Tuesday, March 4, 1913**, for 24-inch and [illegible] 12-inch [illegible]

[illegible] fore-going may be obtained upon application at the office of the Water Works Section, Department [illegible]

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as prescribed by city by-law must be strictly complied with, or the tenders may be declared in-[illegible]

Tenderers shall submit with their tenders the name of two personal sureties, approved by the City Treasurer, or in lieu thereof, the bond of a Guarantee Company, approved as aforesaid.

The lowest or any tender not necessarily [illegible]

H. C. HOCKEN, Mayor,
Chairman Board of Control.

City Hall, Toronto,
[illegible] 10, 1913 7

Tenders for Dredging

Sealed tenders, addressed to the undersigned, and endorsed "Tenders for Dredging, Port Burwell, Ont.," will be received until 4 p.m. on **Monday, March 3, 1913**, for dredging required at Port Burwell, Ont.

Tenders will not be considered unless made on the forms supplied, and signed with the actual signatures of the tenderers.

Combined specification and form of tender can be obtained on application to the Secretary, Department of Public Works, Ottawa. Tenders must include the towing of the plant to and from the work. Dredges and tugs not owned and registered in Canada shall not be employed in the performance of the work contracted for.

Contractors must be ready to begin work immediately on the opening of navigation.

Each tender must be accepted by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, for five per cent. (5 p.c.) of the contract price, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept [illegible]

By order,

R. C. DESROCHERS,
Secretary.

[illegible] Works,
[illegible] 10, 1913

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—35607. 7-8

DALHOUSIE, N. B.

Electric Lighting System

NOTICE TO CONTRACTORS

Sealed tenders will be received by the Town Clerk of Dalhousie, until 8 p.m. on

Wednesday, March 5th, 1913,

for the following works:—

Contract B.—Power House.
Contract G.—Booster Pump.
  (1) Steam Pump.
  (2) Turbine Pump.
Contract H.—Two Boilers.
Contract J.—Electric Light Engine.
  (1) High Speed Steam Engine.
  (2) Gas Engine and Gas Producers.
  (3) Diesel Oil Engine.
  (4) Crude Oil Engine.
Contract K.—Electrical Equipment and Distribution System.

Plans and specifications may be seen on and after February 10th at the office of the Chief Engineers, Mail Building, Toronto, or at Dalhousie, N.B.

No tender necessarily accepted.

W. S. MONTGOMERY, Esq., Mayor.
ALEX. J. Le BLANC, Esq., Town Clerk.
Chipman & Power, Engineers. 7

Tenders For Construction Equipment

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, March 4th, 1913, for**

Concrete Mixers,
Grading Machines,
Tar Kettles,
Road Rollers, three-wheel,
Road Roller, Tandem,
Scarifiers,
Stone Crushing Outfit Complete (Stationary)
Centrifugal Pumps, Portable, with Boilers Mounted,
Boilers Mounted,
Hoisting Engines and Boilers,
Derricks,
Clams,
Buckets,
Excavating Machine, complete,
Diaphram Pumps and Hose,
Inspection Rods.

Specification and tender form may be obtained upon application at the office of the Purchasing Section, Department of Works, City Hall, Toronto.

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as prescribed by City By-law, must be strictly complied with or the tenders may be declared informal.

Tenderers shall submit with their tenders the names of two personal sureties approved by the City Treasurer, or in lieu thereof, the bond of a guarantee company approved as aforesaid.

The lowest or any tender not necessarily accepted.

H. C. HOCKEN, Mayor,
Chairman, Board of Control.

City Hall, Toronto,
January 31st, 1913. 6-7

Tenders Wanted

Sealed tenders registered and endorsed on the envelope. Tender for (Tender bidding on) and addressed to Sydney Appleby, Esq., Secretary-Treasurer of the Town of Sutherland, Sask., will be received up to 6 p.m. **February 24th, 1913**, for the supply and delivery of the following materials and the performance of certain works:—

Tender "A"
For the supply and delivery of approximately 8,650 feet of 12-inch steel pipe and specials.

Tender "B"
For the supply and delivery of approximately 9,775 feet of 10-in. steel pipe or cast iron pipe.
Approximately 4,000 feet of 8-in. steel pipe or cast iron pipe.
Approximately 18,800 feet of 6-in. steel pipe or cast iron pipe and specials.

Tender "C"
For the supply and erection of Stand pipe.

Tender "D"
For the erection of sewage disposal works.

Tender "E"
Trenching and laying 8,650 feet of steel water pipe for supply main, setting valves, etc., and back filling.

Tender "F"
Trenching and laying of approximately 9,775 feet of 10-in. steel pipe or cast iron pipe.
4,000 ft. of 8-in. steel pipe or cast iron pipe.
18,800 ft. of 6-in. steel pipe or cast iron pipe.
Setting valves, hydrants, etc., and back filling.

Tender "G"
Supply and delivery of—
3,420 ft. of 20-in. vitrified sewer pipe.
8,030 ft. of 18-in. vitrified sewer pipe.
2,200 ft. of 15-in. vitrified sewer pipe.
Excavating and laying and construction of manholes, etc.

Tender "H"
The supply and delivery of—
3,766 ft. of 12-in. vitrified sewer pipe.
5,650 ft. of 10-in. vitrified sewer pipe.
5,080 ft. of 8-in. vitrified sewer pipe.
Excavating and laying and construction of manholes, etc.

Tender "I"
For the construction of approximately—
62,000 square feet of concrete sidewalks.
1,670 lineal feet of curb.

Tender "J"
Approximately two and one-half miles of street grading.

Tender "K"
For the supply and delivery of 30 Fire Hydrants, 52 Gate Valves, 1 Automatic Air Relief Valve.

A marked cheque for five per cent. of the amount of the tender must accompany each bid.

The lowest or any tender not necessarily accepted.

For the supplying of materials and all trenching the tender forms must be filled in, these are obtainable at the Consulting Engineers' offices.

Plans and specifications may be seen at the offices of the Consulting Engineers, Saskatoon, Sask.

The Canadian Engineer, Toronto, Winnipeg and Montreal.

Or a complete set of plans and specifications for any contract will be sent on a deposit of Twenty-five ($25) Dollars, and a set covering all the contracts on a deposit of One hundred ($100) Dollars.

This deposit will be returned if plans and specifications are returned within five (5) days of closing tenders.

SIDNEY APPLEBY, Esq.,
Secretary-Treasurer,
Sutherland, Sask.

Messrs. Murphy & Underwood,
Consulting Engineers,
6-8 Saskatoon, Sask.

TOWN OF SARNIA
Province of Ontario

Tenders for Water Works

Sealed tenders registered, and clearly marked on the outside of the envelope "Tender A," "Tender B," etc., as the case may be, and addressed to the Town Clerk, Sarnia, Ont., will be received up to 8 p.m.. **Saturday, March 15th, 1913**, for the supply of material and the construction of:

Contract A.—All labor necessary for laying the force main, and furnishing certain materials therefor.
Contract B.—Furnishing all materials for and constructing pumping station.
Contract C.—Furnishing all materials for and constructing Infiltration Basins Sluiceway.
ontract D.—Furnishing Cast Iron or Steel Water Pipes and Special Castings.
Contract E.—Furnishing Gate Valves, Flexible Joints, Expansion Joints, etc.
Contract F.—Furnishing material for and constructing timber wharf or dock.
Contract G.—Furnishing and erecting Pumping Machinery and accessories.
Contract H.—Furnishing and erecting Boilers and accessories.

Copies of plans, profiles, specifications, instructions to bidders, etc., may be seen at the office of H. A. McLean, Town Engineer, Sarnia, or at the office of Chipman & Power, Toronto, on and after February 1st, 1913.

Persons tendering are notified that tenders will not be considered unless made on forms supplied. Forms will be mailed upon request to the Engineers.

Dr. J. A. BELL, Mayor.
Dr. W. A. HENDERSON,
Chairman Fire and Water Committee.
Sarnia, Ont., Jan. 29, 1913. 6-9

Province of New Brunswick

Department of Public Works

Notice to Contractors

Sealed Tenders Marked

Tenders for the construction of the substructure and approaches of Newcastle Bridge will be received at the Department of Public Works, Fredericton, until **Wednesday, 26th day of February, 1913**, at noon, for building the substructure and approaches of a new bridge on a new site at Newcastle, N.B., over the Miramichi River, between the Parishes of Newcastle and Glenelg, Northumberland Co., N.B., according to plans and specifications to be seen at the Public Works Department, Fredericton, N.B., at the office of Hon. John Morrissy, Chief Commissioner of Public Works, Newcastle, Northumberland County, N.B., at the Provincial Government Rooms, St. John, N.B., and at the Chief Draughtsman's Office of the Public Works Department, City Hall, Montreal, P.Q.

Tenders must be submitted on the Department's standard tender forms, supplied for the purpose. They shall be signed with the tenderer's actual signature, stating occupation and place of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by a certified bank cheque or cash for an amount equal to five per cent. of the tender, which will be forfeited if the party tendering declines to enter into contract when called upon. Such certified bank cheque or cash will be returned to the parties whose tenders are not accepted, but with the party to whom the contract is awarded, it shall be retained until the final completion of the contract and its acceptance by the Department.

All [illegible] the requirements prescribed herein.

The Department does not bind itself to accept the lowest or any tender.

JOHN MORRISSY,
Chief Commissioner.
Department of Public Works,
Fredericton, N.B., Jan. 30, 1913 6-8

City of St. Boniface

TENDERS FOR
Substructure of Bridge

Sealed tenders will be received by the undersigned up to **Monday, the 17th day of February, 1913**, at 5 o'clock, for the supply of material and erection of the substructure of the Provencher Bridge, across the Red River, at St. Boniface.

Plans, specifications and forms of tender may be had at the City Engineer's office, St. Boniface, Man., on and after Monday, February 3rd, 1913.

A marked cheque for $10,000 must accompany each tender.

Tenders must be marked on the outside of the envelope "Provencher Bridge Substructure."

Lowest or any tender not necessarily accepted.

(Signed) J. B. Cote,
6-7 City Clerk.

CITY OF REGINA, SASK.

Regina Municipal Railway

TENDERS

For Track, Paving, Intersections and Specials

Sealed tenders, registered, and clearly marked on the outside of the envelope "Tenders for Street Railway Pavement Track Intersections and special Work," and addressed to the City Commissioners, Regina, Sask., Canada, will be received up to noon, **Monday, the 10th day of March, 1913**, for the supply of:

Contract K.

40,000 sq. yds. track paving with top finish and sub-base

Contract L.

Eleven single track, three part Wyes, 60 lb. A. S. C. E. section.

Eight single track, plain curves, 60 lb. A. S. C. E. section.

Four Turnouts, guarded rail, 60 lb. A. S. C. E. section.

Various cross-overs, Diamond Turnouts and special intersections.

All track intersections and specials to be delivered F.O.B. Regina, freight and duty paid.

Copies of specifications, schedules delivery dates, and blue prints with full particulars, and [illegible] to H. Doughty, Superintendent, The Regina Municipal Railway, Regina, Sask., Canada.

[illegible] will not be considered unless made on form provided. Forms will be mailed upon request to the [illegible]

A [illegible] to the City Treasurer) must accompany each Tender

[illegible]

R. MARTIN, Mayor
G. A. MANTLE,
J. A. THORNTON,
City Commissioners

City of Calgary

Tenders for Asphalt Paving Plant

Sealed tenders, addressed to the City Commissioners, City Hall, Calgary, Canada, will be received at the office of the undersigned up to five o'clock p.m. on **Saturday the 1st day of March, 1913**, for the necessary materials (exclusive of crushers) required for the equipping of an Asphalt Paving Plant for the City of Calgary.

The whole cost of the plant, when complete, not to exceed the sum of $60,000.

Specifications of materials required and full information will be gladly furnished on application to the City Commissioners.

J. M. MILLER, City Clerk.
Calgary, Alta., Feb. 5, 1913 7-8

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors and manufacturers read the "Contract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect.

No extra charge is made for filing plans at one or all four offices.

Contract Record and Engineering Review

Montreal—B34 Board of Trade
Toronto—220 King Street West.
Winnipeg—Commercial Travellers' Bldg
Vancouver—429 Pender Street.

Tenders for Steel Bridge

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, March 11th, 1913**, for Steel Superstructure of St. Clair Avenue Bridge at location east of Bathurst street.

Specification and tender form may be obtained upon application at the office of the Railways [illegible] Hall, Toronto.

Envelopes containing tenders must be plainly [illegible]

The usual conditions relating to tendering as prescribed by City By-law must be strictly complied [illegible] formal

Tenderers shall submit with their tenders the names of two personal sureties approved by the City Treasurer, or in lieu thereof, the bond of [illegible]

The lowest or any tender not necessarily accepted.

[illegible]

City Hall, Toronto,
[illegible] 1913

[illegible] Electrical & Mechanical [illegible] Park, Manchester, Eng., [illegible] with a firm of Construc[illegible] in Canada who wrote them dur[illegible] services as Agents, and [illegible] question will [illegible] 6-8

McMyler Derricks For Sale

[illegible] buckets, hoisting [illegible] steam ham[illegible] derricks, [illegible] boilers, fuel [illegible] Address

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

200 Acres of Rock

[illegible] limestone. Easily worked [illegible] two railroads; forty miles from Toronto. Splendid proposition for a company to handle lime kilns. Dimension, Rubble and Crushed Stone. Particulars G. C. Williams, [illegible] Street, Toronto, Ont. 7-8

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

Power Plants, Electricity and Telephones

(Continued from page 77)

River Thames, to work in conjunction with Hydro-electric power.

Tilbury, Ont.
The Town Council plan installing hydro electric system. Clerk, W. A. Hunter. Equipment required.

Winnipeg, Man.
Telephone material for 1913 required by the Manitoba Government Telephone Commission, McDermot and Charlotte streets. Specifications, etc., at office of Commission, where tenders will be received until February 21.

Cedar poles required by Board of Control. Engineer, J. G. Glassco, 54 King street. 600 40-ft. cedar poles. 600 45-ft. cedar poles for lighting system. Specifications at office of engineer. Tenders received by Secretary, M. Peterson, until February 21.

Woodstock, Ont.
Karn Morris Co., Dunnville, Ont., plan a natural gas system. Representative, R. N. Ball, Drew street. Property has been leased; new mains to be laid.

Miscellaneous

Belleville, Ont.
Machinery. The Tivani Electric Steel Company require the following machinery for plant now in course of construction: electric motor, 2,000 volts, 2 meters, large chuck crusher, also for mines at Orton, 2 small compressors, crucibles and drills.

Kerrobert, Sask.
The Town Council plan to purchase fire fighting apparatus this year. Clerk, O. H. Anderson.

London, Ont.
Motor fire truck, cost $8,000. Fire Chief Aitkin has been authorized to prepare specifications and call for tenders.

Ottawa, Ont.
General supplies. Specifications and schedules are being prepared by the city engineer's department for castings, hydrants, brass and general supplies required by city during 1913. Specifications, etc., at office of engineer. Acting City Engineer, F. C. Askwith.

Supply of refined asphalt required by City Council. Acting City Engineer, F. C. Askwith, City Hall. Tenders close with Chairman of Board of Control, February 13th. Specifications at office of City Engineer, City Hall, and MacLean Daily Reports, Toronto.

Supply of brick required by City Council. Acting City Engineer, F. C. Askwith, City Hall. Tenders close with Chairman of Board of Control, Feb. 13. Specifications at office of City Engineer, City Hall, and MacLean Daily Reports, Toronto.

Twp. Huron, Ont.
Lumber required by Township Council. Tenders received by Clerk, Angus Martyn, Ripley, until Feb. 10th, for the supply of 12,000 ft. tamarac plank, 6,000 ft. 16 ft. long and 6,000 ft. 14 ft. long, each to be 3-in. thick and not less than 5-in. wide.

Winnipeg, Man.
Tenders received until February 26th for two street flushing machines. Tenderers to submit own designs and specifications. Board of Control, Secretary, M. Peterson. Engineer, H. N. Ruttan, 223 James avenue.

Business Notes

Allan, Sask.
Bank, general store, etc., burned, loss $30,000. Owners, Miller & Co., $15,000; J. N. Beaver, $5,000; Northern Crown Bank; E. W. Thomas, $2,500; E. W. Hamann, $3,000; Allan Commission Co. $1,000.

Brandon, Man.
The Windsor Hotel damaged by fire to extent of $5,000. Building fully insured.

Brantford, Ont.
Novelty Store, 144-146 Colborne St., owned by Alfred Tremaine, burned. Occupants, Brewster & Co. Manager, Mr. Werins. Loss to building and stock $20,000.

Calgary, Alta.
Woodworking factory owned by J. M. Bateson, 1239 12th ave. west, burned, loss $60,000. Frame construction, loss includes material and machinery. Fully covered by insurance.

Campbellton, Ont.
Store and residence owned by Thomas Ellsworth, Gerrard street, burned. Loss $25,000; insurance $5,000 on building and $9,000 on stock and fittings.

Edmonton, Alta.
Business buildings, owned by the Canada Rubber Co., burned. Five storeys, brick construction. Also two-storey frame building occupied by Edmonton Produce Co., The Western Cartage Co., The Vernon Fruit Co., The Dominion Brokerage Co., and The Snowdon Oils Co., loss $400,000.

Haileybury, Ont.
Business block, Ferguson ave., burned. Owners, D. Leslie and D. P. Brown. Loss $10,000, insurance about $3,000. Will probably rebuild in spring; new building to be of brick, stone or cement.

La Baie du Febvre, Que.
College owned by the School Commissioners, destroyed by fire. Loss over $24,000. To be rebuilt.

Montreal, Que.
Biscuit factory of McCormick Biscuit Co., 32 St. Dizier street, burned. Loss about $28,000. Will rebuild at once.

Donald McKay Rowat's residence at 572 Lansdowne ave., Westmount, burned, loss $4,000.

Hotel Richelieu, 45 St. Vincent street, burned, loss $38,000, partly covered by insurance. Will rebuild.

Factory of the Ontario Lantern Co., 30 St. Dizier street, burned. Manager, J. W. Moncur. Loss about $10,000. Large building to be built at once.

Manitou, Man.
Normal School burned, loss $14,000. Owner, the Provincial Government, Department of Education. Minister, Hon. Geo. R. Coldwell, K.C.

Ottawa, Ont.
Mica factory of Blackburn Bros., Creighton and Dufferin road, burned. Loss to building, $5,000; loss to equipment, $5,000. Owners contemplate rebuilding at an early date. Machinery required.

Garage, Gilmour street, owned by A. O. Letts, 310 Cooper street, burned. 3 motor cars, gasoline tank and building completely destroyed. Loss $6,000.

Factory of Ottawa Patterson Foundry Co., 74-88 Ottawa street, burned. President, J. S. MacCracken, 35 Metcalfe Sq. Supt., S. R. Francis, 22 Hawthorne ave. Loss about $7,000. Company undecided as to whether they will rebuild.

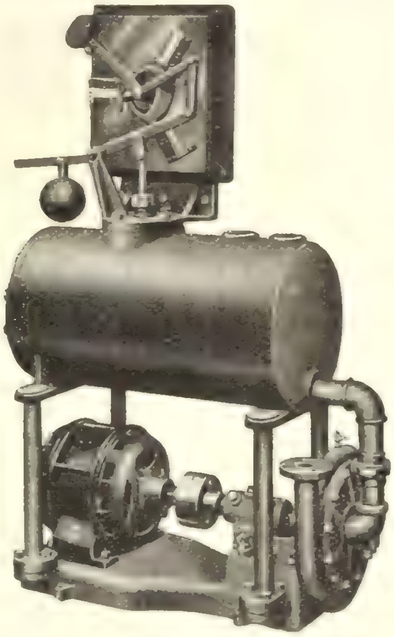
Scottstown, Que.
General store of Roberge & Renaud burned. Loss $20,000. Will rebuild.

Sandwich, Ont.
Grocery store and meat market owned by Page & Richleau burned. Loss about $30,000.

Souris, Man.
Departmental store of D. A. MacKenzie & Company burned. Loss to building $20,000, contents $40,000.

Welland, Ont.
Forge building of the Canada Forge Co., Ltd., Queen street, burned. Loss about $35,000, covered by insurance. Company will erect temporary building and later on build modern steel fireproof structure.

CENTRIFUGAL PUMPS
to take care of the
Water of Condensation



We show here a simple and effective means of draining steam jackets, heating systems, steam coils, drying cylinders, etc. The condensed steam is led to the inlet at the top of the receiver and falls to the bottom. The water in rising lifts a float switch and the motor starts and stops the pump automatically. This arrangement obviates the use of steam traps or tanks and, in addition, automatically returns to the boiler all water of condensation.

THE JOHN McDOUGALL
CALEDONIAN IRON WORKS CO., LIMITED

Works: Seigneurs & William Sts., MONTREAL **Sales Offices ; MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER**

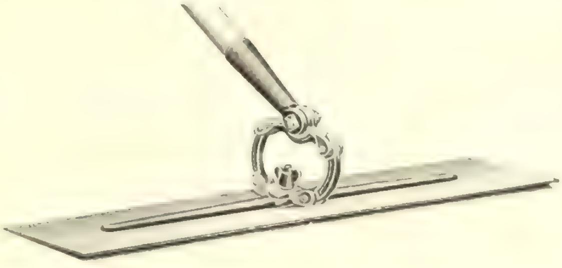
Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery, Pumps—centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants.

Tenders Wanted

should be advertised for in the "Tenders and For Sale Department" of the CONTRACT RECORD AND ENGINEERING REVIEW. This paper is the "Tender Ad." medium of Canada and always brings bids from the reliable contractors and supply houses.

File your plans for any work on which you are inviting bids, in our offices at Toronto, Montreal, Winnipeg or Vancouver.

Contract Record
and Engineering Review
Toronto Ontario



24 inch Abram Trowel

Abram Sidewalk Finishing Tools are the original **Automatic "Wrist Motion" Tools,** and the only Sidewalk tools made having this **"Wrist Motion"** and long handles. Our list of customers now contains the names of some of Canada's Largest Contractors. Every Set of **"Abram"** Tools is sold on the Guarantee that **ONE MAN** can do more work with them than **THREE MEN** can with old style tools.

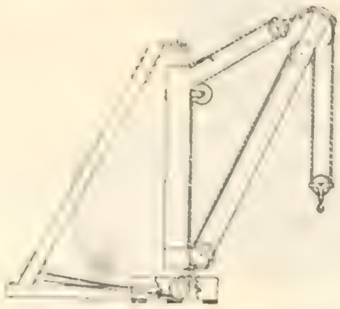
Write today for Circular. You can save 10 on the cost of a set if you order before March First, and also get 10 days free trial. Trowel, Jointer and Edger in a "Set."

Abram Cement Tool Co.
105 Ouellette Ave., Windsor, Ont.

HOISTING ENGINES

DERRICKS

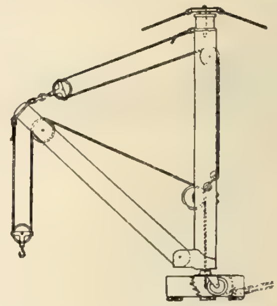
Horse Powers Winches or Crabs

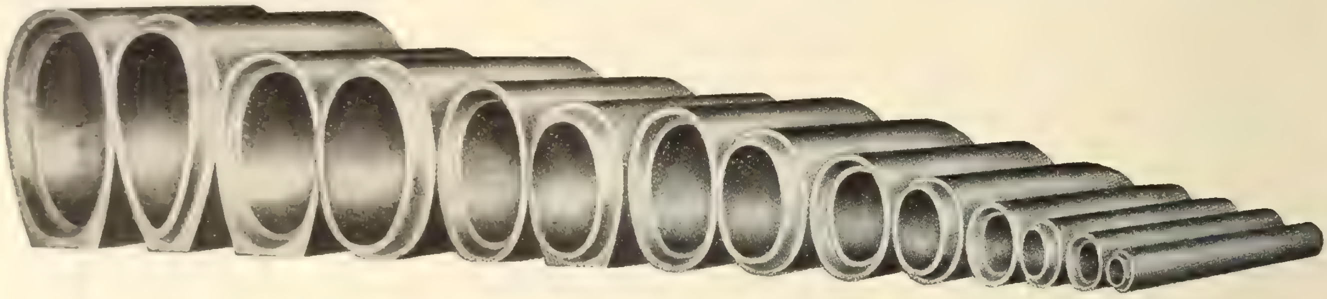


Standard sizes and capacities of Derricks in stock for immediate shipment

Get our catalog and prices. They will interest you—All goods guaranteed.

MARSH & HENTHORN
Limited
Makers of Hoisting Machinery **Belleville, Ont.**
Sales Agents : MUSSENS LIMITED, Montreal





Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario

EQUIP YOUR CELLAR

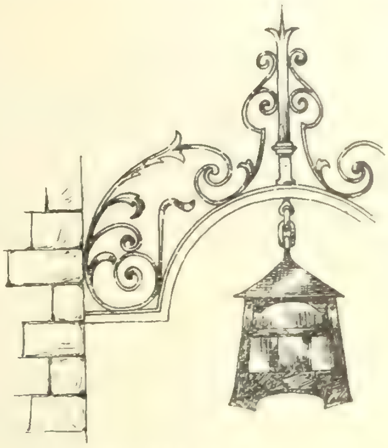
with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.
Montreal Representative : E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

Ornamental Wrought Iron Work



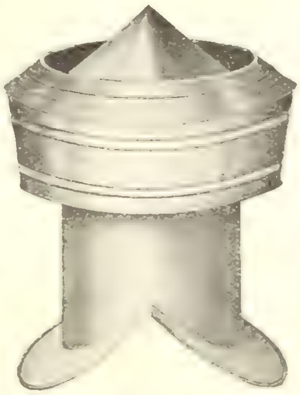
We make and design

Wrought Iron Brackets — Lanterns and Lamps — Lamp Standards — Grills and Railings

Architects designs executed with fidelity and spirit

Dennis Wire & Iron Works Co. Limited
London, Ont.
Toronto Branch : 36 LOMBARD STREET

"HALITUS" Ventilators



Highly Efficient
Inexpensive

Sizes 6 to 96 inch Diameter Neck Meas't.

The Flanged **"Halitus"** just as shipped, all ready to nail on the roof.

Catalogue and price list on request.

The Metallic Roofing Co. LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.

Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath.

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, ***General Sales Agent***
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers

Current Prices of Building Material.

BRICKS

The following are wholesale prices delivered at Toronto:—

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

[illegible]

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No 2 Hemlock dimension and 1-in.	16 00	18 00

[illegible]

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
7/8 x 8 and 10 in. pine shelving	36 00	40 00
7/8 x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

[illegible]

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

Cedar Posts—Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for box lots:—

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.30; 1-inch, $1.35; ¾-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.30 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

Lime, per cwt., delivered, not less than 1,500 lbs. 33 cents; white, 43 cents.

Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

PAINT AND OILS

Pure White Lead, ground in oil, $8.75 per 100 lbs.

Boiled Linseed Oil, in bbls., 62c. per gal. of 9 lbs.

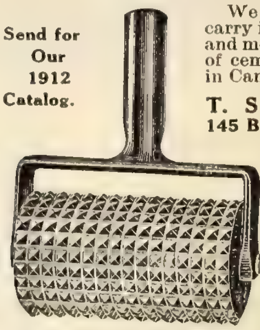
Raw Linseed Oil, in bbls., 59c. per gal. of 9 lbs.

Turpentine, in barrels, 58c per gallon.

Pure Red Lead, dry $7 to $8 per 100 lbs.

Putty, pure linseed oil, in bulk, bbls., 3½c.

Putty, pure linseed oil, in 25-lb. tins, 4c.



Cement Sidewalk Tools
Send for Our 1912 Catalog.
We manufacture and carry in stock the largest and most satisfactory line of cement sidewalk tools in Canada.
T. SLACK & CO.
145 Brock Ave., Toronto
Representatives
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Western Lumberman
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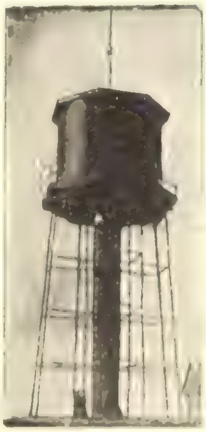

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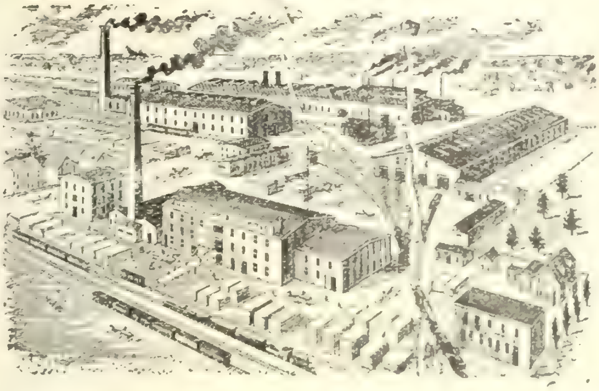

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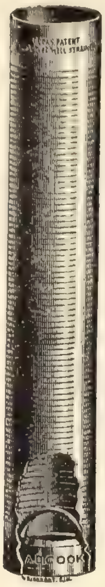

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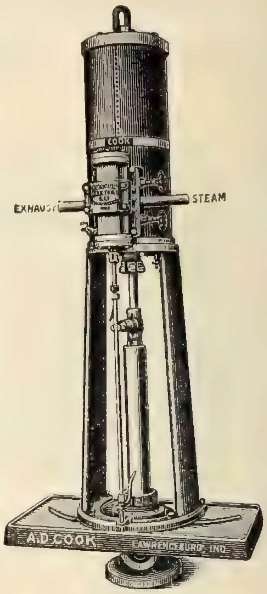

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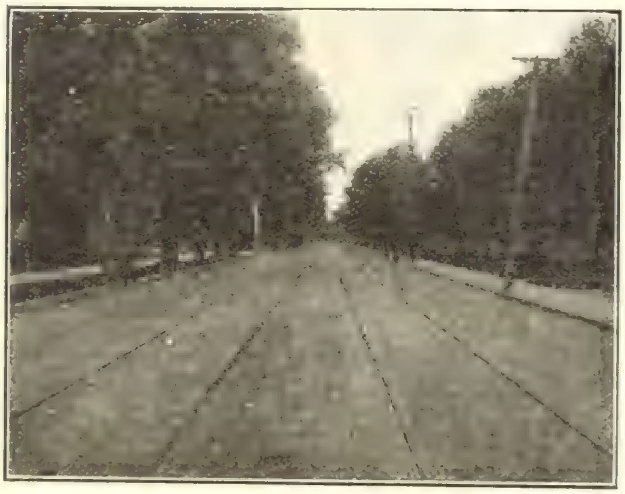

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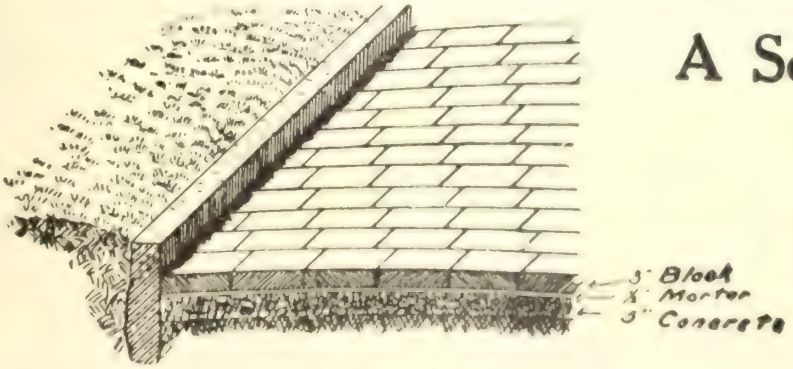

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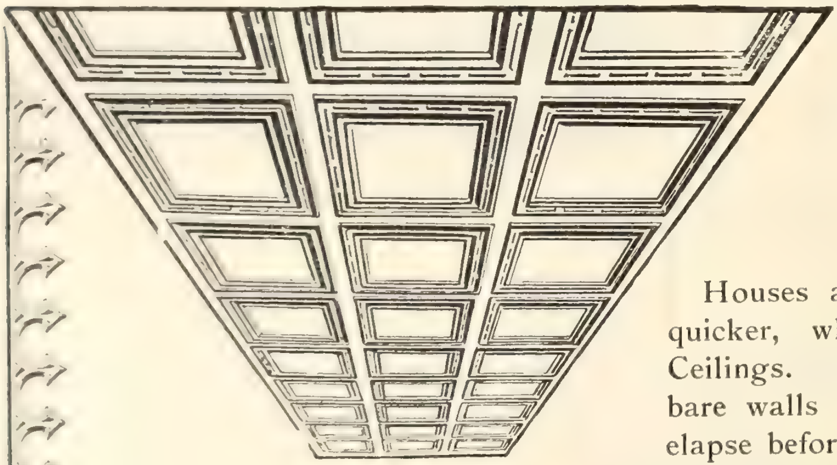

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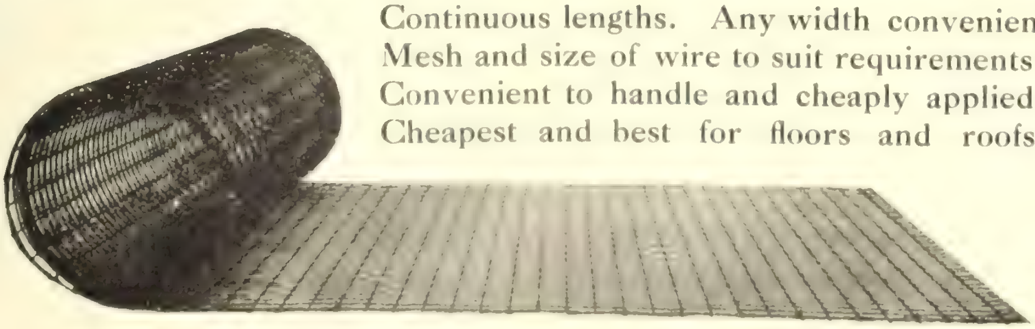

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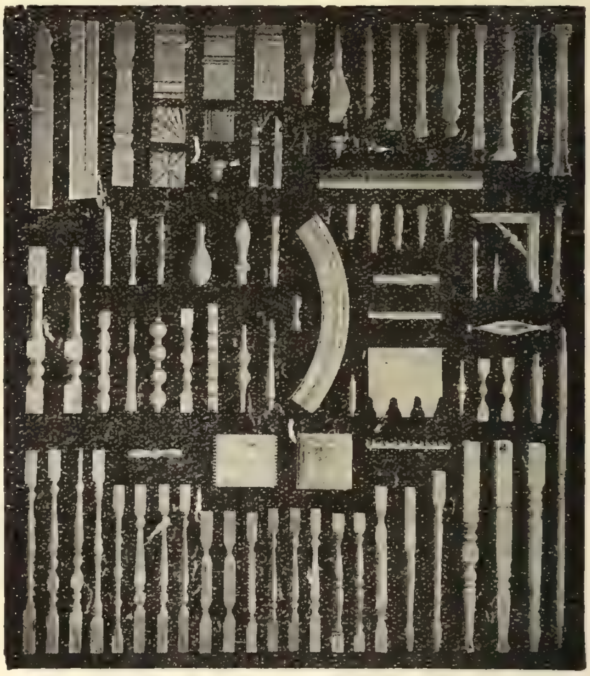

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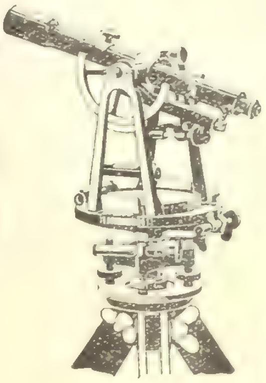

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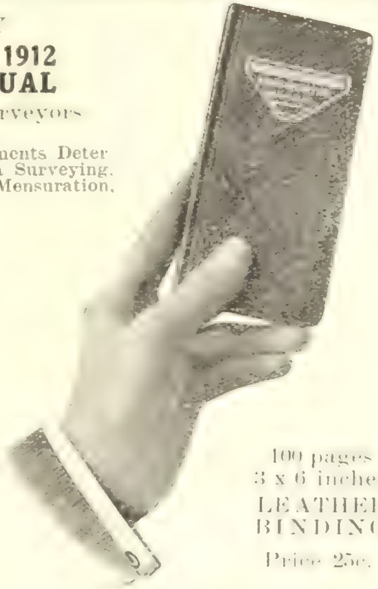

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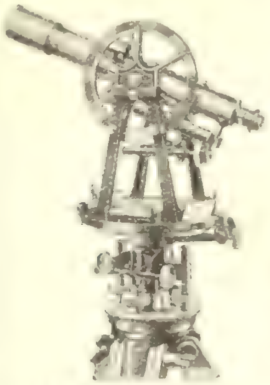

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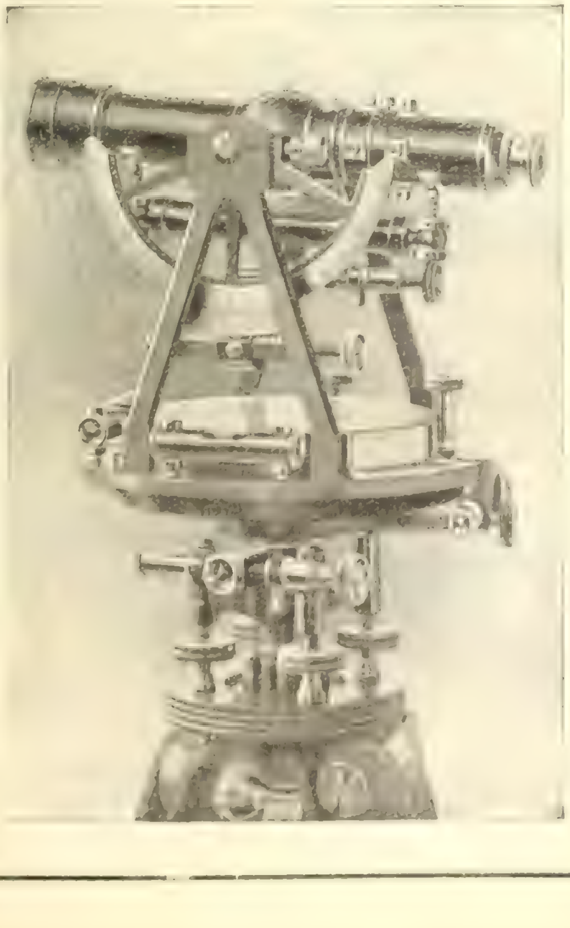

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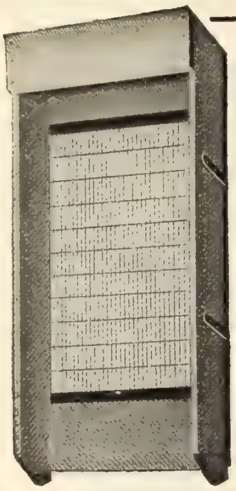

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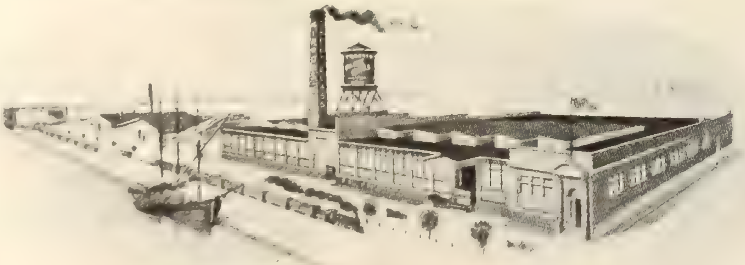

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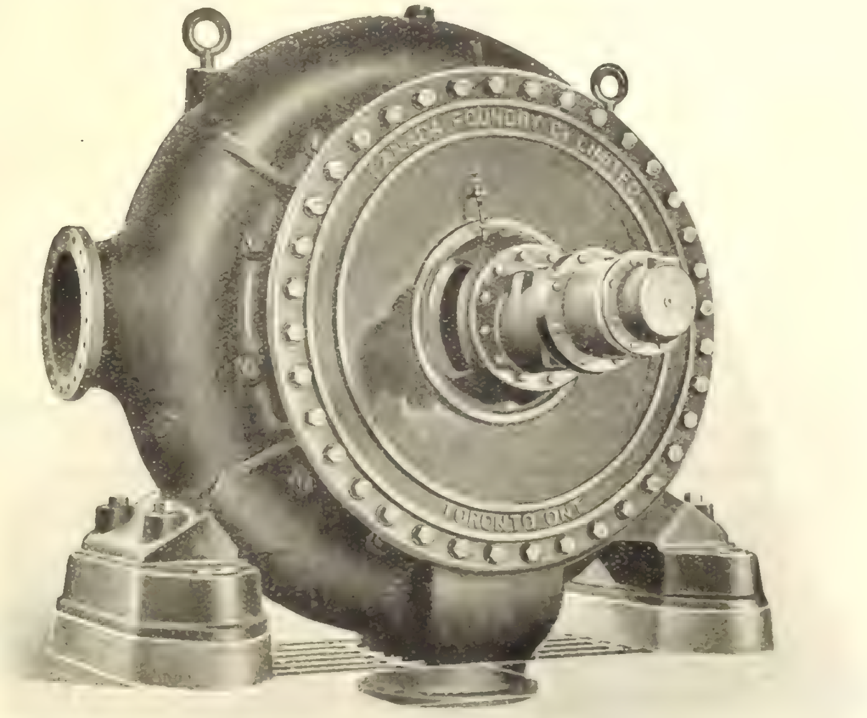

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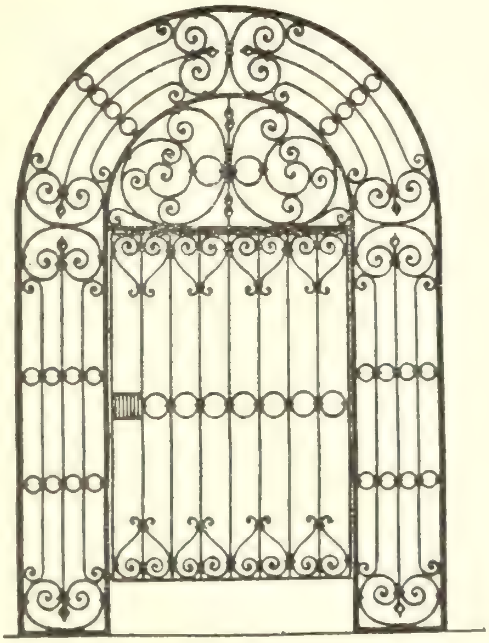

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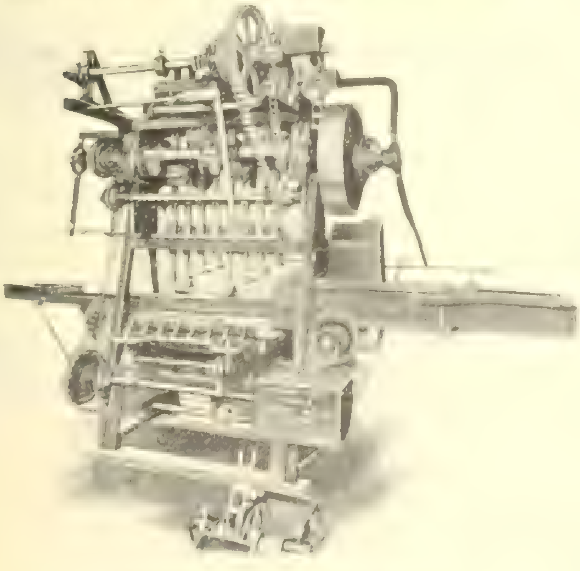

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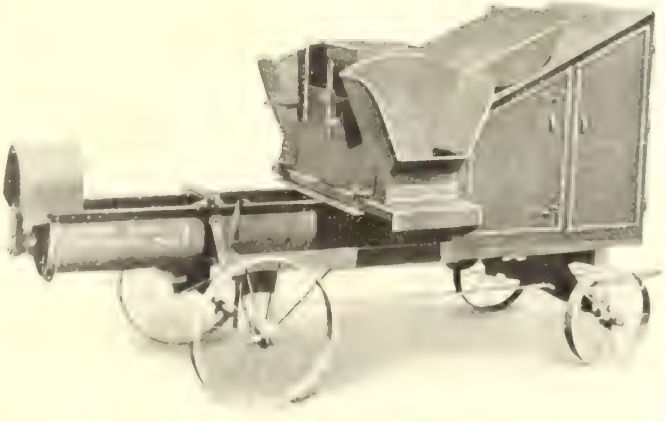

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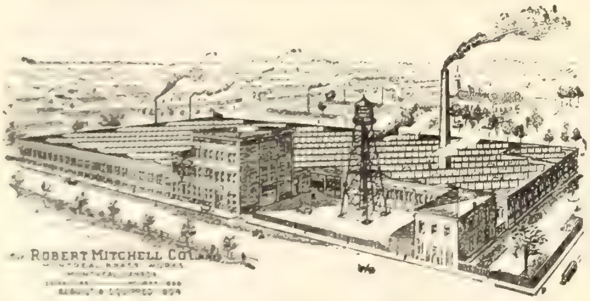
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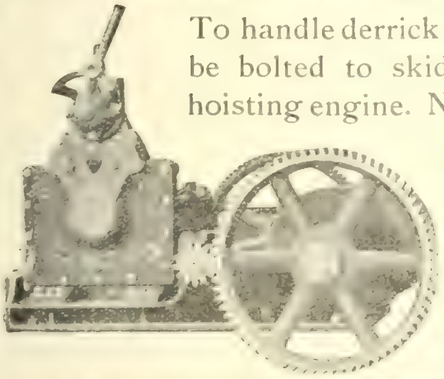

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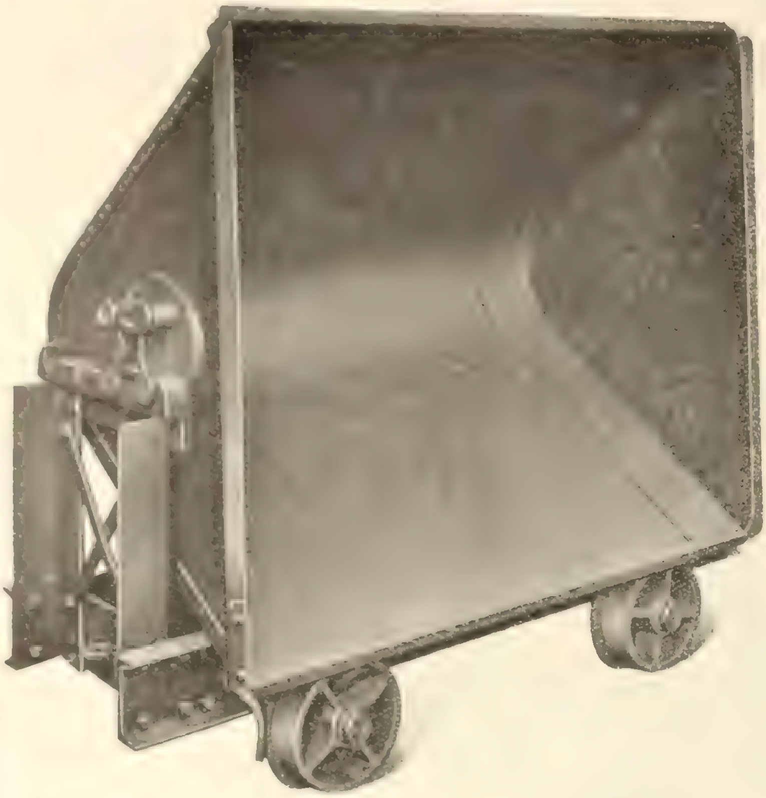

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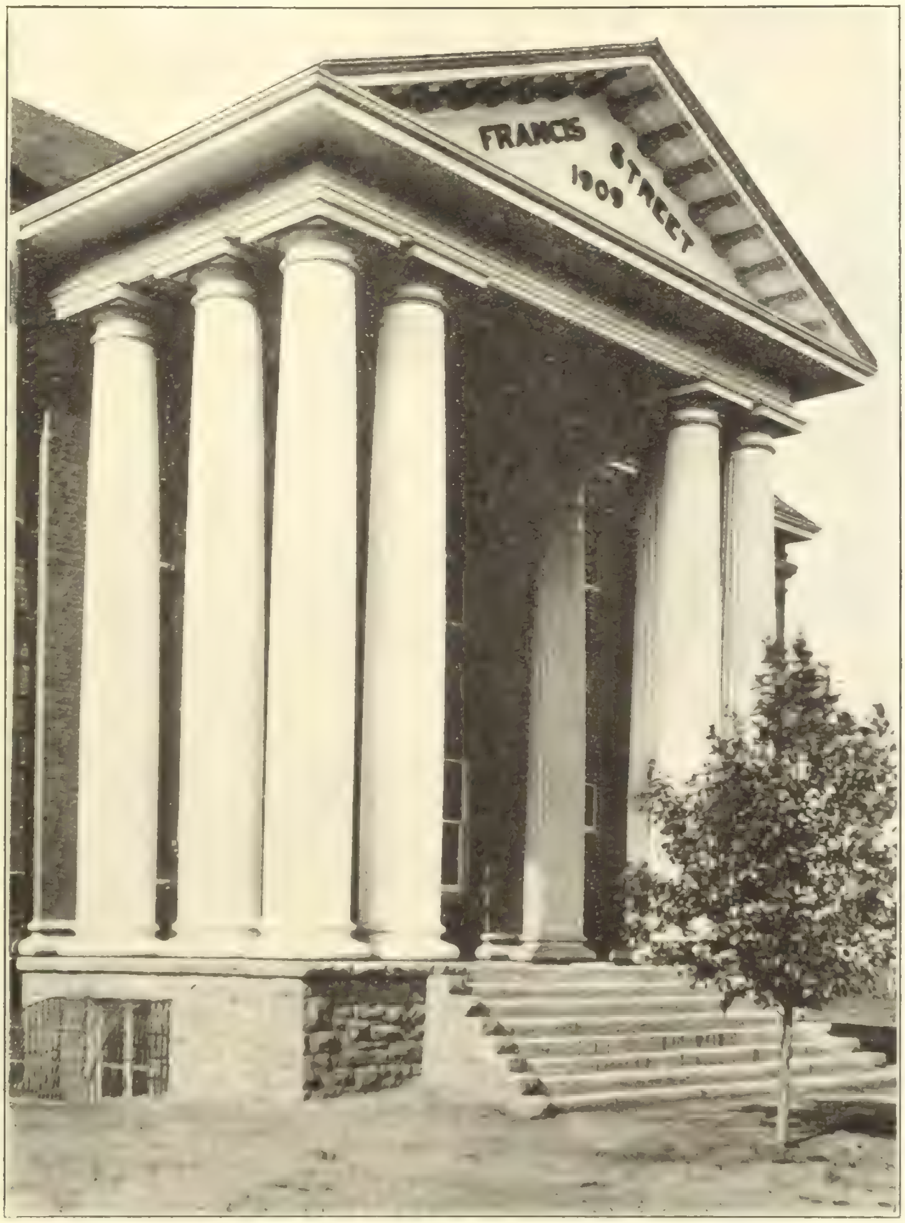

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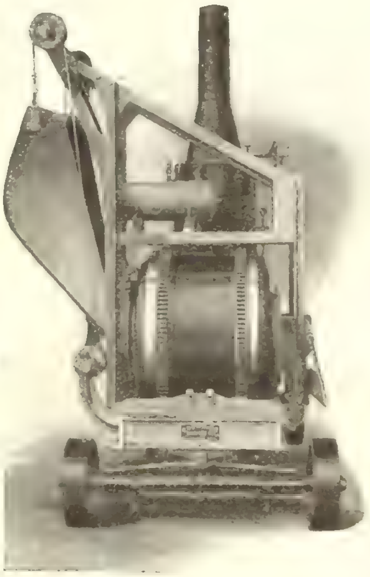

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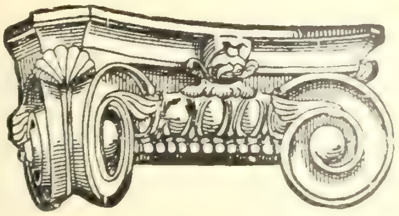

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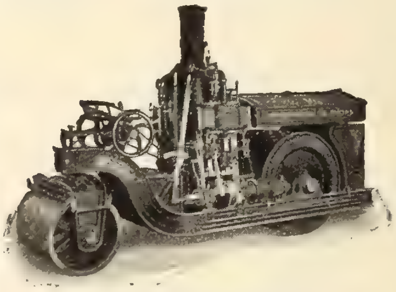

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Scott, Hammond & Pratt, Limited,
65 Victoria Street
WINNIPEG
Barker & North, 26 Princess Street

WHY
THE CHAIN BELT DRIVE?

THE CHAIN BELT DRIVE will outwear gearing three to five times. Side bars and rollers are of steel, pins and bushings are case hardened steel.

The CHAIN BELT Drive is flexible and therefore not subject to sudden and unexpected breakage as the teeth of a gear.

The CHAIN BELT Drive reduces friction 20%.

Every link of our CHAIN BELT Drive is tested and inspected before leaving our shop.

We guarantee the CHAIN BELT and sprockets used for the drive for a period of two years.

The CHAIN BELT Drive is only one of the many features of the CHAIN BELT Mixer.

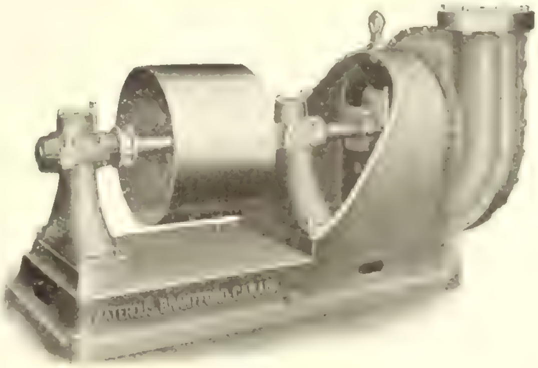
Send for catalog 42C and get the whole works.

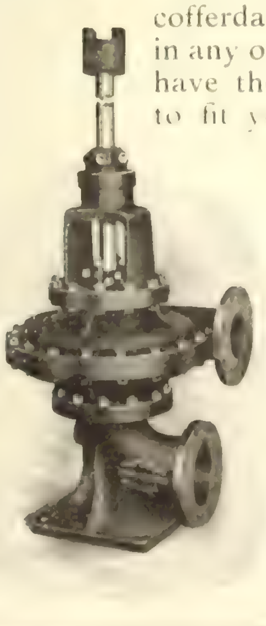
CHAIN BELT CO., MILWAUKEE WISCONSIN

Dominion Equipment & Supply Co., ... *Winnipeg, Manitoba.*
Dominion Equipment & Supply Co., ... *Vancouver, B. C*
Canada Machinery Agency, . . . *Montreal Quebec.*

Doing Any Pumping?

If you are doing excavation work, are sand dredging, pumping sewage, cofferdam draining or using a pump in any one of a dozen other ways, we have the right type, style and size to fit you out.





Waterous Trouble-proof Centrifugal Pumps

Can Be Used In Every Service

They are built in Vertical and Horizontal types, in sizes from 4 in. to 14 in. discharge opening, and can be used with belt engine or motor drive. They are extremely simple, for a given capacity take a minimum space and are built of selected materials to be practically unbreakable.

We guarantee these pumps for material and workmanship.

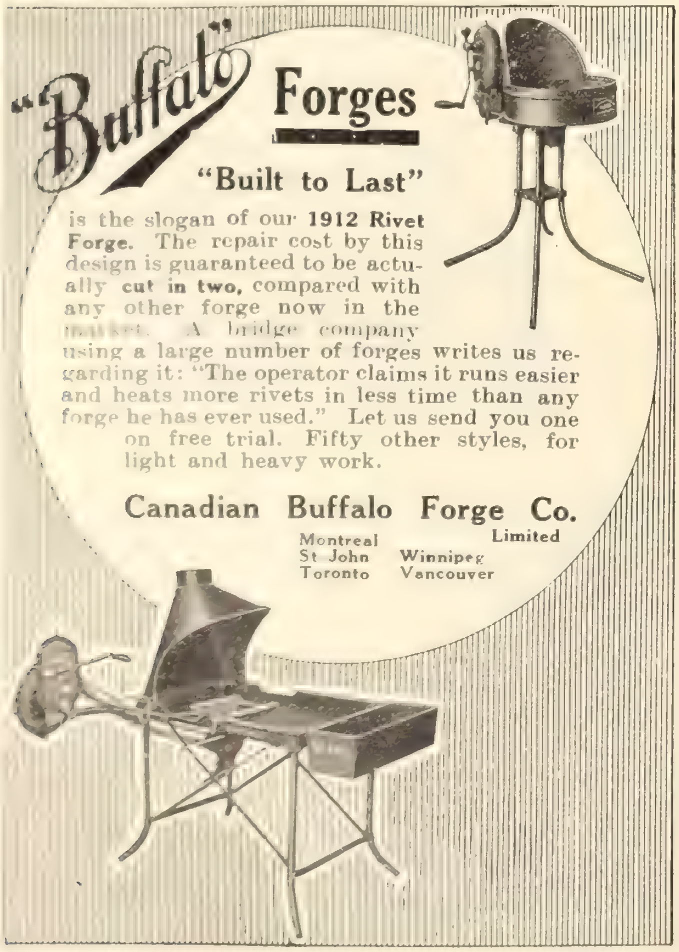
Description in Bulletin No. 200

The Waterous Engine Works Co., Ltd.
Brantford, Canada

"Buffalo" **Punches Shears and Drills**

Among our recent designs is the Bar Cutter No. 10 for cutting concrete reinforced bars—twisted, round or any other shape. It cuts bars up to 1¼" thick and, due to its steel frame, its **weight is only half** that of a cast iron machine of the same capacity. Ask for catalog of Steel Punches, Shears and Drills No. 115.

Canadian Buffalo Forge Co.
MONTREAL Limited
St John Winnipeg
Toronto Vancouver



"Buffalo" **Forges**

"Built to Last"

is the slogan of our **1912 Rivet Forge.** The repair cost by this design is guaranteed to be actually **cut in two,** compared with any other forge now in the market. A bridge company using a large number of forges writes us regarding it: "The operator claims it runs easier and heats more rivets in less time than any forge he has ever used." Let us send you one on free trial. Fifty other styles, for light and heavy work.

Canadian Buffalo Forge Co.
Limited
Montreal
St John Winnipeg
Toronto Vancouver

Structural Water-proofing

Our organization affords every opportunity for successful work of this character.

(a) The character of our material.

(b) The consistency of our methods.

The Dehydratines—bituminous liquids and mastics for water proofing and damp proofing under what is termed The Membraneous Method.

Hydratite— (Paste or Powder) for waterproofing by the Integral Method.

Symentrix— exterior masonry paint also applicable for floors.

Symentrin—interior flat wall finish.

Ferro-Fax—for hardening concrete floors to resist traffic and prevent dusting.

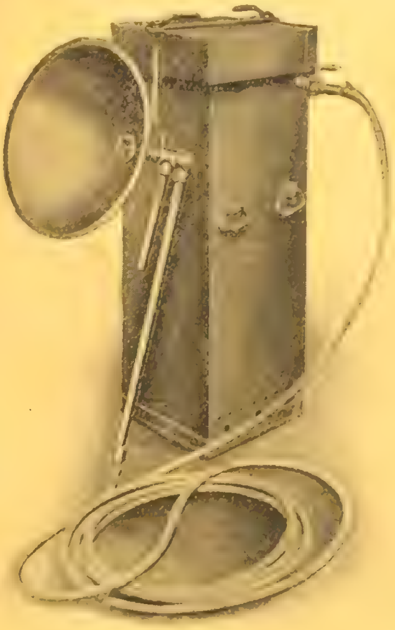
Write for Catalog and References

Pinchin-Johnson & Co.
(Canada) Limited
AGENCIES IN ALL CITIES

"The Minerva Emblem Stands for Reliability"

5,000 to 12,000 Candle Power at 5 cents Per Hour

How is that for cost? Can you beat it with any other light? The Milburn Acetylene Light is cheaper than oil or arc lights and just as simple as gas in your own house.



The Milburn Light shown here has a 15-inch aluminum, non tarnishing reflector, with absolutely storm-proof burner on swing joint, and 25 feet of armored hose and connections. It has a water-tight cover and is made to withstand hard usage, the vibration and movement of wrecking cars, cranes, steam shovels, dredges, etc. The light follows the crane or shovel and throws its rays directly upon the work.

THE MILBURN LIGHT

is made by water and carbide, burns more than half air, and requires no attention during use. Most of the fittings are of standard sizes, obtainable anywhere. It lights instantly and is absolutely safe. Tens of thousands of these lights are in constant use by all classes of users and not a single accident has ever been reported. They are now being used on all kinds of construction work in all parts of the world. Up-to-date contractors swear by them. You had better get acquainted with the Milburn Light.

Ask for Catalog No. 15

The Canadian Fairbanks-Morse Company, Limited

Montreal St. John, N.B. Ottawa Toronto Winnipeg
Calgary Saskatoon Vancouver Victoria

ADANAC RED CORE RUBBER COVERED WIRES AND CABLES

RUBBER COVERED TRADE ADANAC MARK WIRES AND CABLES

Are made according to the specifications of the National Board of Fire Underwriters. The conductors are drawn from copper of the highest conductivity and are covered with two thicknesses of thoroughly vulcanized rubber compound of high quality. The wires are braided over insulation and the smooth high finish they receive makes them specially desirable for conduit work.

IMPERIAL WIRE AND CABLE COMPANY
Limited
MONTREAL

THE Northern-Electric AND MANUFACTURING CO LIMITED
Sales Agents

TORONTO REGINA WINNIPEG
CALGARY EDMONTON VANCOUVER

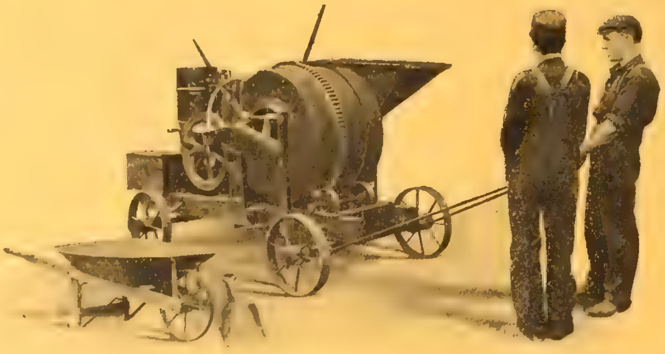
Everybody Who Builds

Concrete Walls, Concrete Walks or Curbs, Concrete Anything

can have the best Concrete that can be made at the least possible cost

BECAUSE

Our No. 4 RANSOME MIXER



No. 4 Ransome Concrete Mixer.

is the equal of our larger machines in efficiency and is sold at a price which makes it an easy and a wise purchase for anybody.

It has a batch capacity of 4 cubic yards per hour, which is ample for any small concrete job. No. 4 Mixers are sold in one way only : i. e.—mounted on Trucks, with gasoline engine, direct drive. This is a powerful engine for its rated H. P. and the best designed—a most perfect operating engine.

The No. 4 Ransome is a great time saver in every respect. As we equip these machines with a special batch charging hopper, which is being filled while the batch in the drum is mixing—no time is lost in charging drum. By the simple lever arrangement, the whole unmixed batch is fed into the drum in an instant and the loading gang keeps right on with their work without any waits whatever. The batch is instantly discharged by merely reversing the discharge chute.

Let Us Send You Particulars

F. H. Hopkins & Co.

MONTREAL

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Vol. 27 Toronto, February 19, 1913 No. 8

ESTABLISHED 1886

Contract Record and Engineering Review

Steam Pumps, Vacuum Pumps
Condensers, Triplex Power Pumps
Duplex Power Pumps, Centrifugal
Pumps, Travelling Cranes

The Smart-Turner Machine Co.
LIMITED
HAMILTON, CANADA

"MADE IN CANADA"

Bent Glass

Made in all
Kinds of
Glass
on Short
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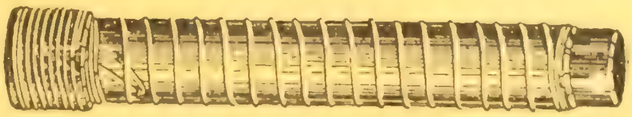
Large Bent Plate Glass for Shop
Fronts a Specialty

The Toronto Plate Glass Importing Company, Limited
(HILL & RUTHERFORD, Managing Directors)
Head Office and Works : 91 to 133 Don Roadway
TORONTO

ELECTRIC HOISTING
ENGINES,
"ELECTRIC AIR"
ROCK DRILLS
CAMERON
PUMPS

Canadian Ingersoll-Rand Co.
Limited
Commercial Union Bldg., MONTREAL, CAN.
See our ad on page [illegible]



Continuous and Machine Banded Wood Stave
WATER PIPE
RESERVOIR TANKS
for city and town Water Systems,
Fire Protection, Power Plants,
Hydraulic Mining, Irrigation, etc.
One-half the cost of Iron Pipe—
and better.

Pacific Coast Pipe Co., Limited
P. O. Box 563 Vancouver, B. C.
Office and Factory, Granville St., near High Bridge
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Full Particulars and Estimates Furnished

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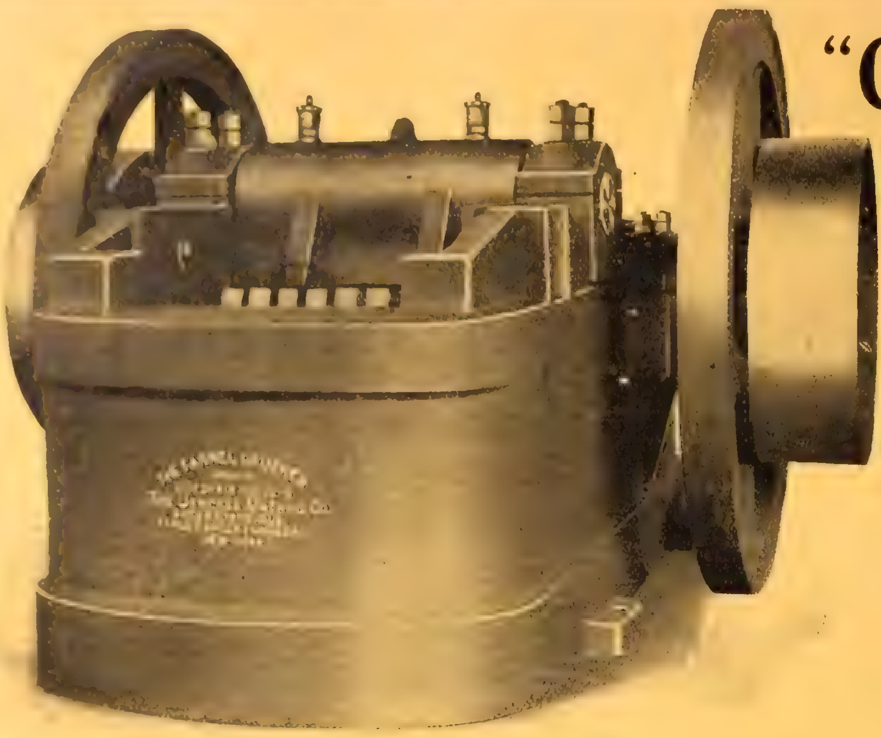

"CRUSHERS"

Complete Crushing Plants

Our Specialty

Many Years Experience and Exceptional Facilities

Ask for Copy of New Catalogue

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General Offices: Sherbrooke, Que. Works: Sherbrooke, Que. - St. Catharines, Ont.

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No Other Hoisting Engine Built

can do as much severe work as the

"AMERICAN"

It does its work with less human power, fuel, wear and expense, and with greater speed and accuracy than any other similar engine on top of earth.

When you need a Hoisting-Engine, let us prove these claims to you.

American Hoist & Derrick Co.

ST. PAUL, MINN.

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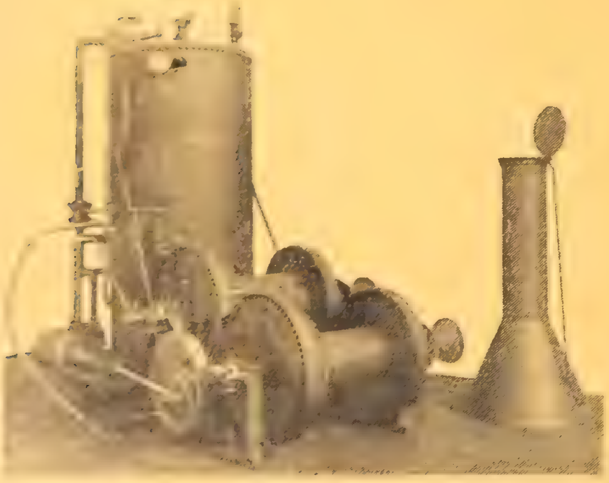
Vancouver Machinery Depot, Ltd., Vancouver, B. C.
Stuart Machinery Co., Winnipeg, Man.



Canada-wide Distribution!

When you, Mr. Engineer, plan a building—or when you Mr. Contractor, erect it—you are usually anxious to get it completed as soon as possible.

Delay in completion is certain to cause complaints and confusion—and is likely to cause financial loss.

Therefore, in selecting materials, it is to your advantage to specify the Cement made by the Company best equipped to supply your requirements quickly, for thus you reduce the danger of delayed delivery. The Canada Cement Company's mills—located at Exshaw, Calgary, Winnipeg, Port Colborne, Shallow Lake, Belleville, Marlbank, Lakefield, Hull and Montreal—are so placed as to provide the quickest possible delivery to any point in Canada.

WE HAVE CANADA-WIDE DISTRIBUTION

Quick delivery is an important point. Complete delivery of your whole order is even more important. Canada Cement mills have sufficient capacity to completely fill all orders promptly.

Write for "Factories and Warehouses of Concrete."
It will interest you. Enclose 12 cents in stamps for postage.

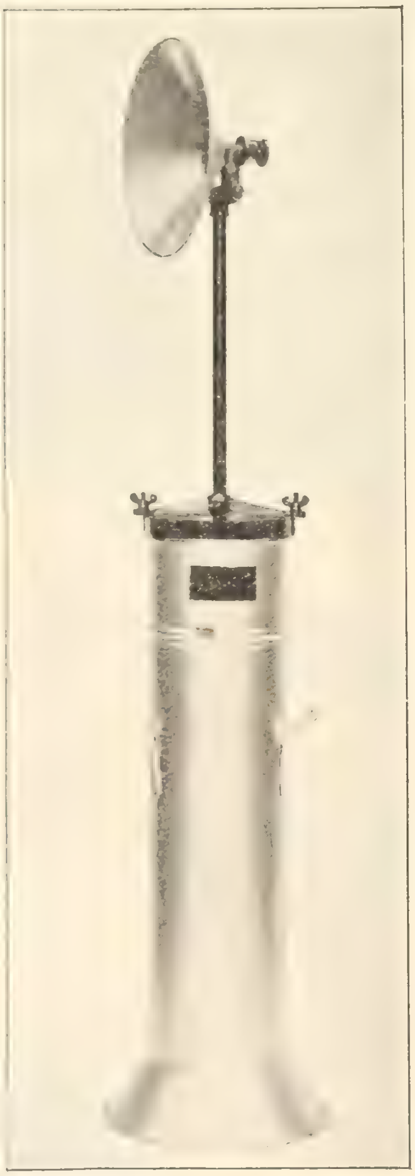
CANADA CEMENT COMPANY LIMITED PORTLAND CANADA CEMENT MONTREAL.

Canada Cement Company
Limited
No. 62 Herald Building - MONTREAL
Sales Offices: TORONTO - WINNIPEG - CALGARY

CANADA CEMENT COMPANY LIMITED PORTLAND CANADA CEMENT MONTREAL.

The

Carbic Light



Has

No Equal on the market for Efficiency, Simplicity and Low Cost. It is much easier and cleaner to handle than any other similar light.

PRODUCES 2000 C. P.

Is absolutely nonexplosive. No gas is being generated when the light is not in use therefore no waste.

Portable Compact Durable
No Intricate Parts

Montreal, 318 St. James St.
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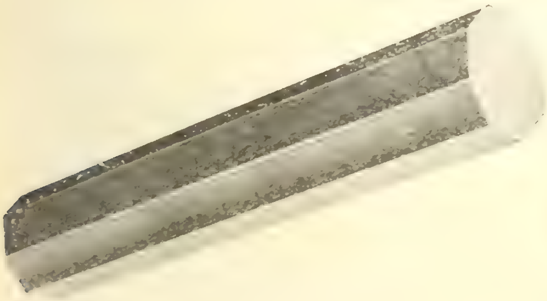
Cobalt, opp. Right of Way Mine.

MUSSENS



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Octagon—Ribbed—Canted Corners—Hollow Hexagon—Hollow Octagon—Cruciform

Always Carried in Stock

Bickford-Smith Famous

White Jacket Safety Fuse

Is Always Reliable. It Never Runs and Never Misses Fire

We Also Stock Blasting Batteries

With Necessary Leading and Connecting Wires

LIMITED

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(Continued on page 12)

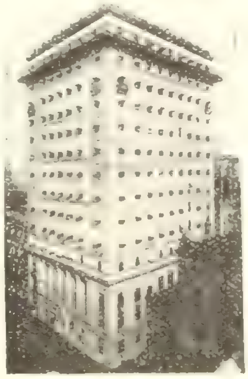
Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Lumsden Building, Toronto
J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.
Don Valley Fireproofing, Bricks and Tile used throughout.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.



Traders Bank, Toronto
Carrere & Hastings and F. S. Baker, Associate Architects.
Don Valley Porous Terra Cotta Fireproofing and 2,000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Royal Bank, Toronto
[illegible] G. Bird associated with Carrere & Hastings, Architects. Norcross Bros. Contractors.
Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

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Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

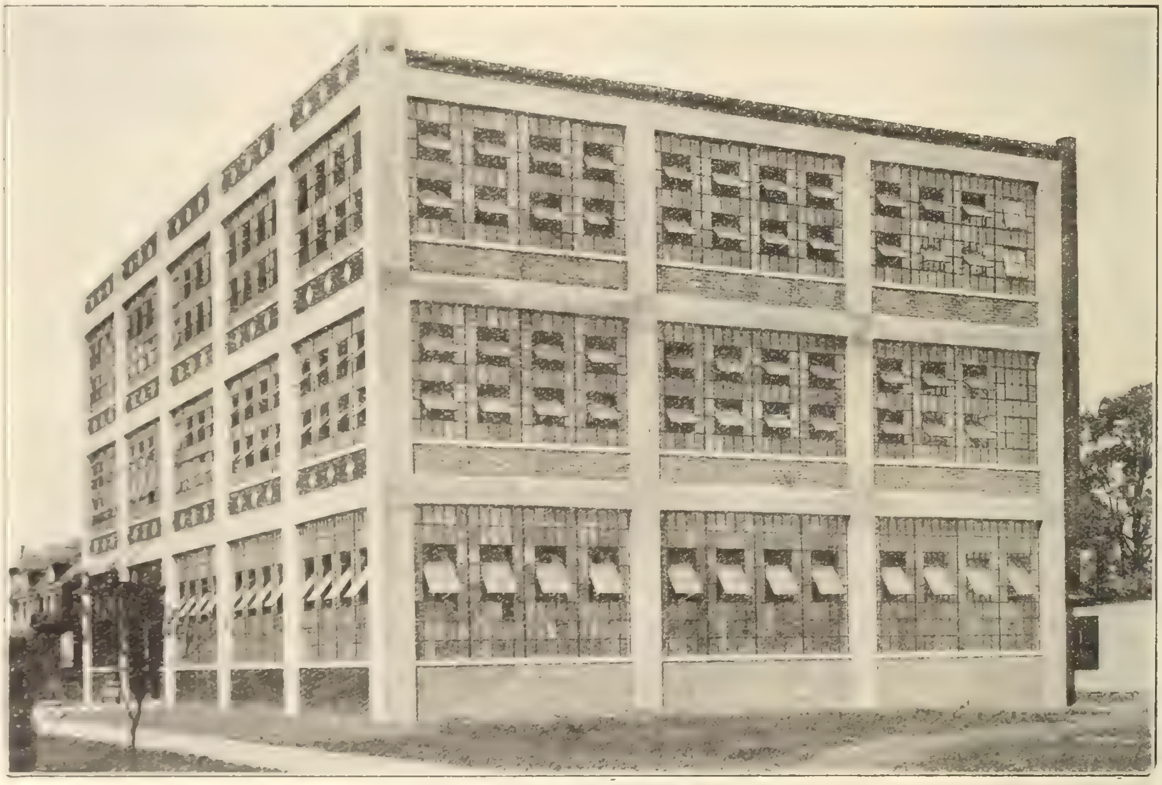
TORONTO - ONTARIO

LIGHT + VENTILATION = PROFITS

FENESTRA SOLID STEEL WINDOWS will provide your factory with an abundance of pure air; and light practically as good as that "out doors." Your employees will be able to do more and better work.

FENESTRA STEEL SASH not only increases production, but also reduces costs. Window upkeep expenses and artificial lighting bills are reduced almost to the vanishing point.

FENESTRA SASH is inexpensive compared with wooden sash, which is short lived and inflammable. It affords the minimum obstruction to light. It is attractive in appearance, strong and durable. Made to meet all conditions and sizes of window openings.



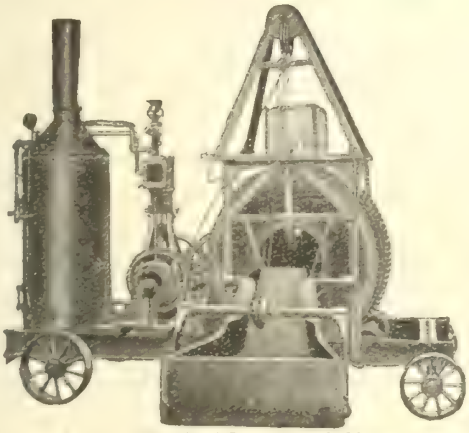
One of many buildings in Canada equipped throughout with "FENESTRA."

WRITE TO-DAY FOR CATALOG describing fully the merits of steel sash for all types of industrial buildings, large or small. FENESTRA has no equal for windows for foundries, power houses, factories, public buildings, machine shops, draughting rooms, railroad shops or any other buildings where the maximum light and ventilation are desired.

STEEL AND RADIATION, LIMITED

TORONTO, CANADA

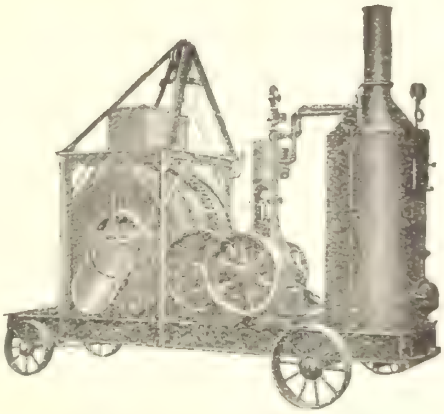
Concrete Mixers



London Standard Drum Batch Mixer

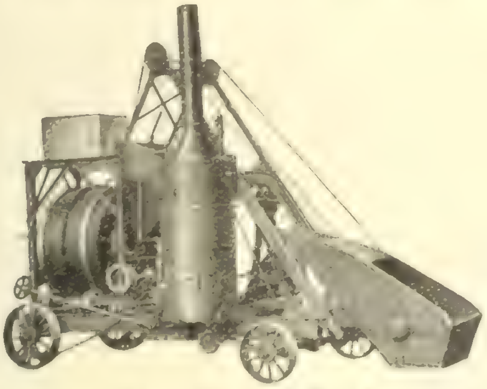
must be built Strong and of the Best Material.

The First Cost of a Concrete Mixer is only a Small Item if it is continually breaking down.



London Standard Drum Batch Mixer

The London Mixers are built **up to a Standard** not down to a price. **By manufacturing on a large scale** we have been able to sell **High Grade Machines** at Remarkably Low Prices.



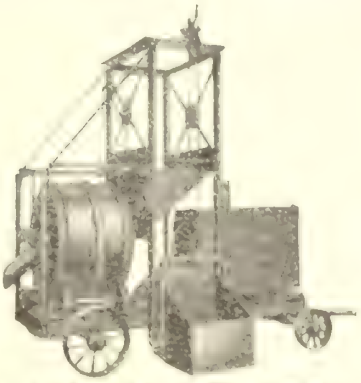
London Paving Mixer with Front Loader and Rear Discharge

We manufacture a complete line of Concrete Machinery and Cement working Tools and Contractors' Equipment.

London Mortar Mixer

London Automatic Batch Mixer No. 1

Ask for our 1912 Catalogue. It contains information for every Contractor.



London Special Paving Mixer with Front Loader and Rear Discharge

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
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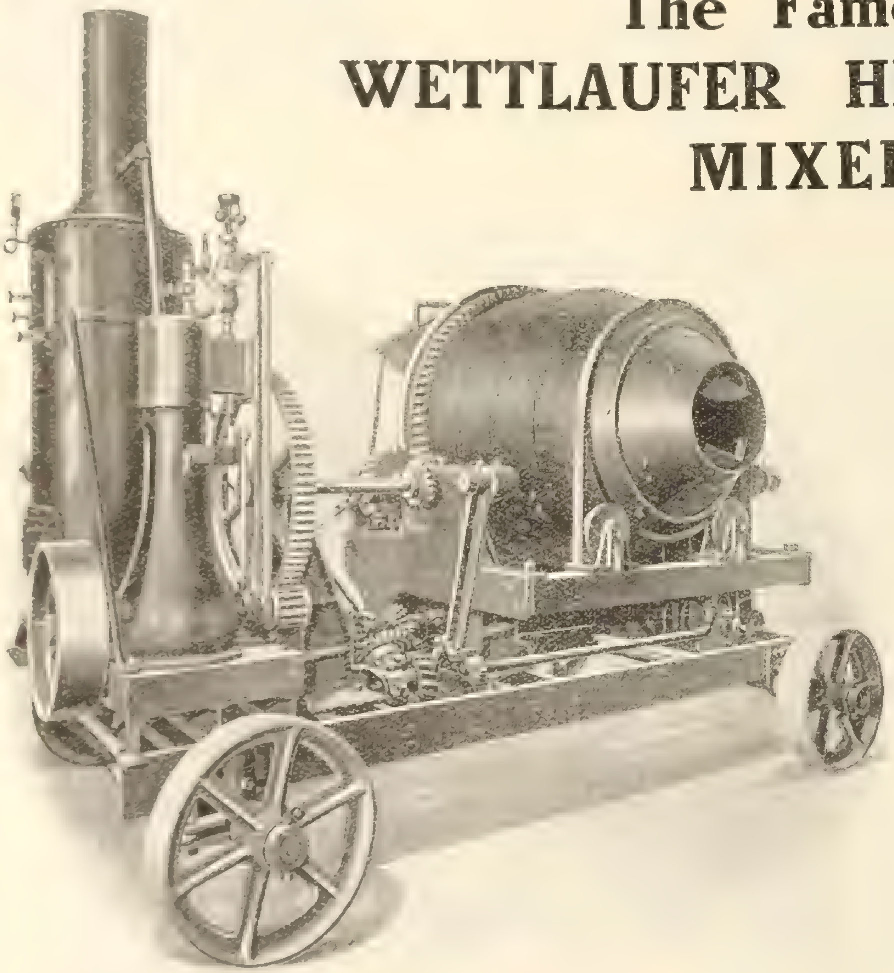
You **must** have a **Good Mixer** some time—You can't go on putting up with a poor makeshift—You will realize some time that you **must** have a mixer that will do the best work, and when you realize that you will naturally turn to

The Famous WETTLAUFER HEARTSHAPE MIXER



This is the mixer that will do **good work** for you **all the time** — the mixer that saves you time and money and increases the efficiency of your equipment.

Strong Construction

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We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

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CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

Ice-making Machinery
- Linde British Refrigeration Co.

Insulating Compounds
- Canadian Mineral Rubber Co.
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Interior Finish and Doors
- Batts Limited
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Kilns
- Canadian Buffalo Forge Co.
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Lime
- Jamieson Lime Co.
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- Improved Equipment Co.

Locomotives
- Canadian Boving Co.
- Montreal Locomotive Works
- Canada Foundry Co.

Marble
- Dominion Marble Co.
- Lautz Company
- Missisquoi Marble Co.

Metal Lath
- Greening Wire Co., B.
- Metallic Roofing Co.
- Noble, C. W.
- Steel & Radiation Ltd.

Metal Forms
- Hotchkiss Lock Metal Form Co.

Meters, Electrical
- Ferranti Electrical Mfg. Co.

Meters, Water
- Hopkins & Co., F. H.
- McDougall Caledonian Iron Wks
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- Gartshore-Thomson Pipe Co.
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- American Hoist & Derrick Co.
- Browning Engineering Co.
- Canadian Ingersoll-Rand Co.
- Lecky & Collis
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Planing Mill Exhausters
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- Bates & Edmonds
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- Canada Foundry Co.
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- Canadian Buffalo Forge Co.
- Canadian Fairbanks-Morse Co.
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- Escher Wyss & Co.
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- McDougall Caledonian Iron Wks.
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(Continued on page 14)

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In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

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can be dumped and righted by fewer men and in less time than required for the same operation on many other cars

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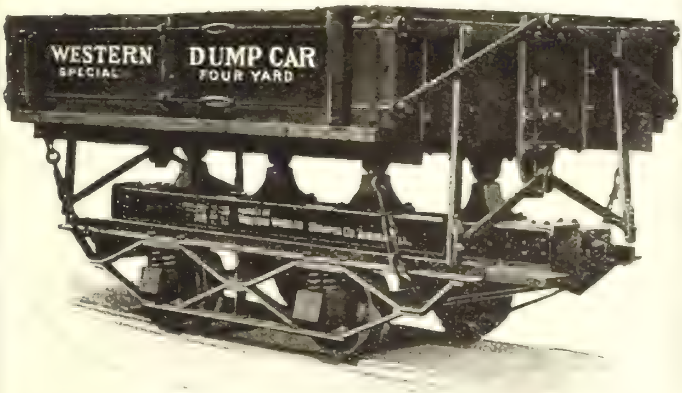

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The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902
Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

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Total $376.17 or 5⅔c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

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Cabot Inc., Samuel

Shovels (Steam)
Browning Engineering Co.
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February 27 1912.

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How can I be sure of securing 'Barrett' goods?"

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"Thousands of owners have reached the same conclusion you have, namely, that all roofings that need periodical painting, like tin and ready roofings, are unduly expensive to maintain. The way to avoid this is to give a copy of the Barrett Specification to your roofing contractor and secure prices on that basis.

The Barrett Specification is simply a formula requiring certain grades and quantities of material and specifying how the roof shall be laid. The Specification further states how the roof may be inspected to ascertain whether you have secured the required five plies of felt with continuous intervening layers of pitch.

If you order a Barrett Specification Roof and insist that the Specification be followed absolutely, you are certain of what you are getting. Your Barrett Specification Roof will never need painting and should give good service for twenty years or more without leaks and without a cent of maintenance expense."

Copy of the Barrett Specification with tracing ready for incorporation into your building plans sent free on request.. Address nearest office

Special Note

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[illegible]	84
[illegible] worth & Sons, William	
[illegible]	
[illegible]	93
[illegible] Motor Truck Company	38
[illegible] Works	89
[illegible]	92
[illegible]	2
[illegible] Works	27
[illegible]	
[illegible] Limited, George	24
[illegible]	
[illegible]	104
[illegible]	87
[illegible]	89
[illegible]	92
[illegible] R. D.	79
[illegible]	
[illegible]	
[illegible] M	34
[illegible]	
[illegible]	
[illegible] k Building Supply Company	21
[illegible]	87
[illegible]	104
[illegible]	98
Browning Engineering Company	92
[illegible]	103
[illegible]	32
[illegible]	98
[illegible]	94
[illegible]	93
Cabot, Incorporated, Samuel	
[illegible]	104
[illegible]	3
Canada Foundry Company, Limited	95
[illegible]	103
[illegible]	82
[illegible]	27
Canada Wire & Cable Company	27
Canada Wire & Iron Goods Company	91
Canadian Boving Company	28
Canadian Bridge Company	100
[illegible]	110
Canadian Fairbanks-Morse Co., Ltd.	111
Canadian H. W. Johns-Manville Co.	19
Canadian Kellogg Company	
[illegible] Company	14
Canadian Office School Furniture Co.	
Canadian Pipe Company, Limited	83
Canadian Ingersoll-Rand Company	1-22
Canadian Supply Company	39
[illegible]	97
[illegible] in Belt Company	91
[illegible]	104
[illegible]	
Commercial, The	
[illegible]	103
[illegible] Stone Company	110
[illegible]	19
[illegible]	
Contractors' Supply Company, Ltd.	98
[illegible]	
Corinthian Stone Company	
[illegible]	
[illegible]	85
Dake Engine Company	103
Dennis Wire & Iron Works Company	81
DesMoines Bridge & Iron Company	101
[illegible] Works	
Dominion Bridge Company	100
[illegible] Concrete Co.	80
[illegible]	86
Dominion Ornamental Iron Company	
Dominion Marble Company	19
Dominion Sewer Pipe Company	18
Dominion Steel Castings Company	26
Dominion Wood Pipe Company	91
[illegible] Works	7
Doty Marine Engine & Boiler Co.	36
[illegible]	40
Elaterite Paint Company	
Engineering Works of Canada	31
Erie Machine Shops	84
Escher Wyss	97
Farmer, John T.	104
Ferguson, H. S.	104
Ferranti Electrical Company	12
Foundation Company	105
Fraser, E. M.	104
Frece & Smith	104
Galt Engineering Company, John	104
Galt Stove & Furniture Company	80
Gardner & Saxby	104
Gartshore, John J.	104
Gartshore-Thompson Pipe & Foundry Co.	102
Gaudry & Company, L. H.	109
Gibbs & Canning	91
Goheen Manufacturing Company	24
Goodyear Tire & Rubber Co. of Canada, Ltd.	37
Greening Wire Company, Limited, B.	
Gurley, W. & L.	93
Hagersville Contracting Company	13
Hancock, Jr., H. Syd.	104
Hamilton Art Glass Co., Ltd.	
Hamilton Bridge Company	25
Hamilton Mfg. Company, Wm.	19
Hamilton Pressed Brick Company	96
Harvey, J.	78
Heinicke Company, H. R.	18
Hepburn, John t.	33
Hobbs Manufacturing Company	
Hopkins & Company, F. H.	112
Hotchkiss Lock Metal Form Company	85
Hunt & Company, Robert W.	104
Improved Equipment Company	
Imperial Wire & Cable Company	111
Inglis Company, John	21
International Marine Signal Co.	39-92
Jamieson Lime Company	106
Jenckes Machine Company	2
Jennings & Ross	108
Jones & Glassco	
Kennedy, James C.	104
Kerr Engine Company, Limited	
Koehring Machine Company	108
Laurentian Granite Company	84
Laurie & Lamb	107
Lautz Company	
Lea, R. S.	104
Lecky & Collis	17
Leonard & Sons, E.	85
Linde British Refrigeration Company	
London Concrete Machinery Company	9
Lundy Shovel & Tool Company	
Luxfer Prism Company	
MacLean Daily Reports	109
Mahan & Company	82
Mannesmann Tube Co.	
Marsh & Henthorn, Limited	80
McDougall Caledonian Iron Works Co., John	79
McDowall, R.	104
McKinnon Holmes & Company	107
McMillan & Sons, W.	82
McNeil & Company, William P.	102
Meadows, George B.	39
Metal Shingle & Siding Company	
Metallic Roofing Company	81
Miller & Company, Geo. M.	
Missisquoi Marble Co., Ltd.	92
Mitchell Company, Limited, Robert	100
Montreal Locomotive Works Limited	85
Morrison & Company	104
Mussens Limited	4
Myers, Oakley	85
Napanee Iron Works	17
National Bridge Company of Canada	101
National Iron Works Limited	103
National Pipe & Foundry Company	102
Neptune Meter Company	101
Noble, Clarence W.	81
Northwestern Terra Cotta Company	94
Ontario Asphalt Block Co., Ltd.	89
Ontario Sewer Pipe Company	18
Ontario Wind Engine & Pump Co.	85
Ormsby Limited, A. B.	20
Oshawa Interior Fittings Company	
Owen Sound Iron Works	
Pacific Coast Pipe Company	1
Paterson Manufacturing Company	15
Pedlar People	35
Phoenix Bridge Company	94
Piggott & Company, Thomas	
Pinchin Johnson & Company	110
Power & Son	
Provincial Steel Company	26
Queenstown Quarry Company	103
Reid & Brown	104
Rhodes Curry Company, Limited	87
Rogers, Limited, Alfred	11
Roman Stone Company	30
Royce Limited	32
Sackville Freestone Company, Limited	34
Sand & Supplies Limited	102
Sarnia Bridge Company, Limited	101
Sawyer Belting Company	13
Sheldons Limited	20
Sheppard, James	106
Silcox, A. B.	84
Slack & Company, T.	84
Smart-Turner Machine Company	1
Smith Limited, Thos. & Wm.	88
Smyth & Ryan	94
Standard Clay Products Company	25
Standard Ideal Company	40
Standard Steel Construction Co.	101
Standard Underground Cable Co. of Canada	
Stanley Company, W. F.	
Star Expansion Bolt Company	
Steel Company of Canada	26
Steel & Radiation	8
Stinson-Reeb Builders' Supply Co.	
Structural Steel Company	100
Sturtevant Co. of Canada, Ltd., B. F.	99
Taylor, J. & J.	
Thew-Automatic Shovel Company	36
Tiffin Wagon Company	23
Toledo Wheelbarrow Company	
Toronto Plate Glass Importing Co.	1-94
Toronto Iron Works	89
Troy Wagon Company	
Trussed Concrete Steel Company	98
Tuec Company	
Turner, C. A. P.	
United States Steel Products Co.	29
United Typewriter	94
Urscrel-Bates Valve Bag Company	82
Waterous Engine Works Company	93
Weeks, Arthur L.	104
Welch & Company, H. J.	104
Wells & Gray	90
Western Canada Contractor	98
Western Wheeled Scraper Company	13
Wettlaufer Bros.	10
Woodstock Wind Motor Company	99
Wood and Service	104
Wooliscroft & Son, G.	91
York Sand & Gravel Company	98

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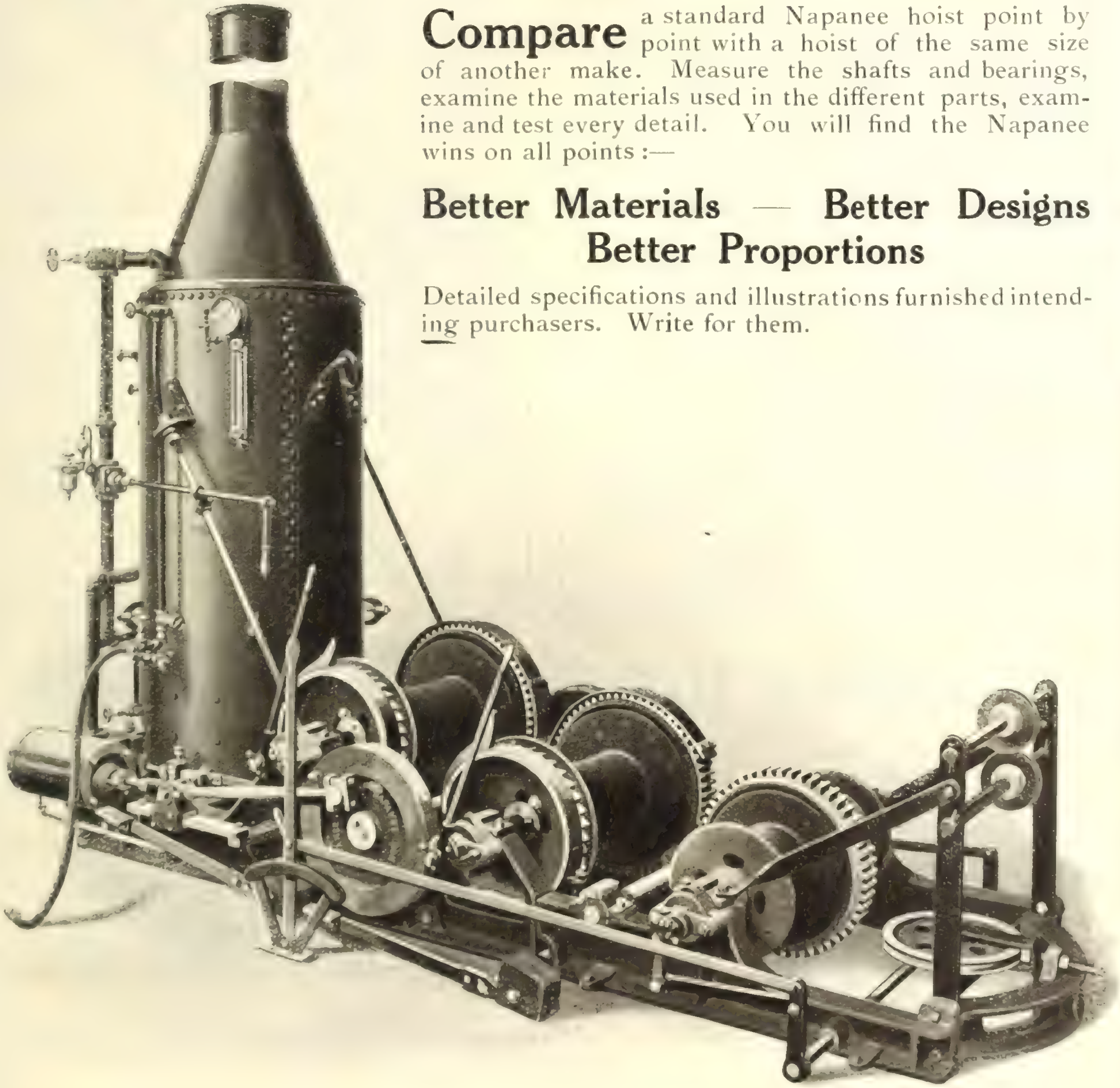

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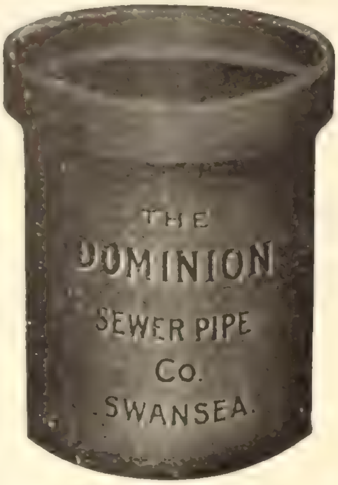

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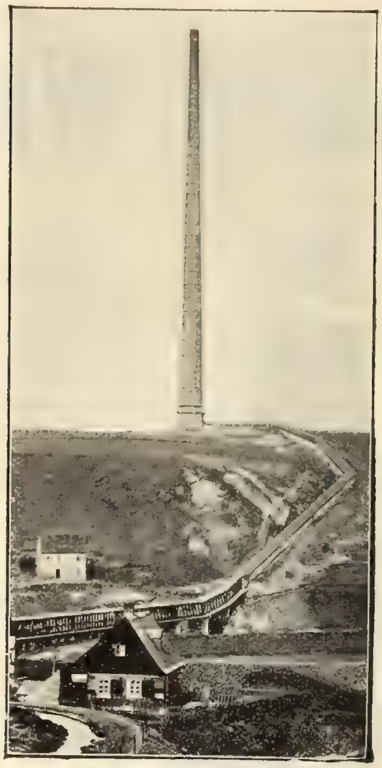

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Vitrified and Verified

By Making Your Deals Early

All signs point to a record year in Vitrified Sewer Pipe as well as other lines. For everything we need in our business we are making contracts now, feeling quite sure that we are thereby saving money.

Our Stock of Sewer Pipe

Is big today but a few tomorrow's might materially alter things

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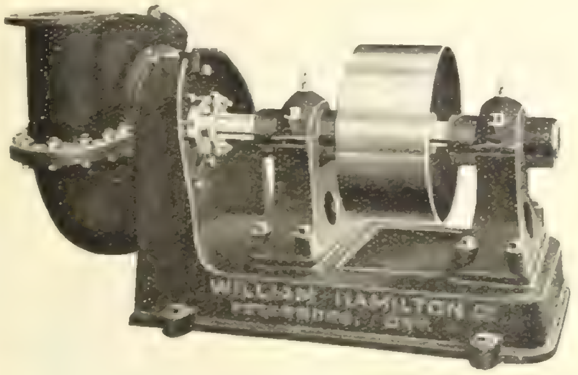
The Ontario Sewer Pipe Company, Limited, Mimico, Ont.

Agents for Patented Vitrified Segment Block for Sewers over 24 inch



Centrifugal Pumps

Notice that in our pumps the shell is split horizontally and the housing is open at the top. This permits of the pump being easily taken apart for cleaning without disturbing the piping.

There is also room enough between the pulley and bearings to prevent any oil dripping on the belt.

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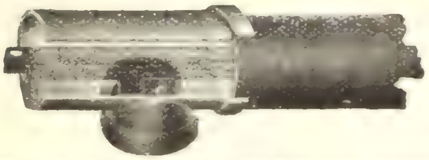
William Hamilton Company

Peterborough, Ontario

J-M Conduit Pays for Itself and Also Saves $2,300



The following comparison for five years of conduits carrying [illegible] feet of 6-inch steam mains and 3-inch returns conclusively proves that J-M SECTIONAL CONDUIT is the best system for conveying steam, water, gas, brine, ammonia or any other liquid underground. It shows a net saving of J-M SECTIONAL CONDUIT over wood covering of $2,050 and over brick or concrete of $1,100.

	Highest Type of Wood Covering (75% Efficiency)	Brick or Concrete Tunnel or Trench (75% Efficiency)	J-M Sectional Conduit (90% Efficiency)
Cost including proper insulation of pipes	$2,500	$2,565	$2,500
Depreciation in 5 yrs.	1,250	235	—
Total cost for 5 yrs....	$3,750	$2,800	$2,500
Saving of fuel over bare pipe in five years—200 tons coal at $4.00 ton. J-M Sectional Conduit 240 t. saved..	$4,000	$4,000	$4,800
Cost for five years (as above).	3,750	2,800	2,500
Net saving over cost..	$250	$1,200	$2,300

Write nearest Branch for Catalog No. 112

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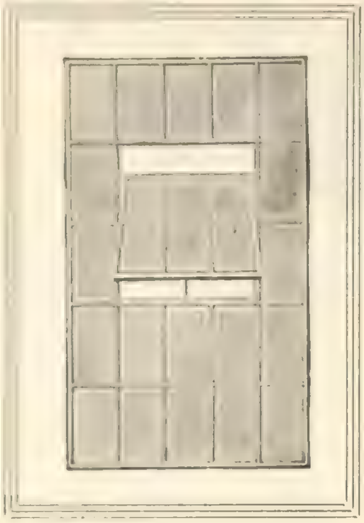

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Manufactured by

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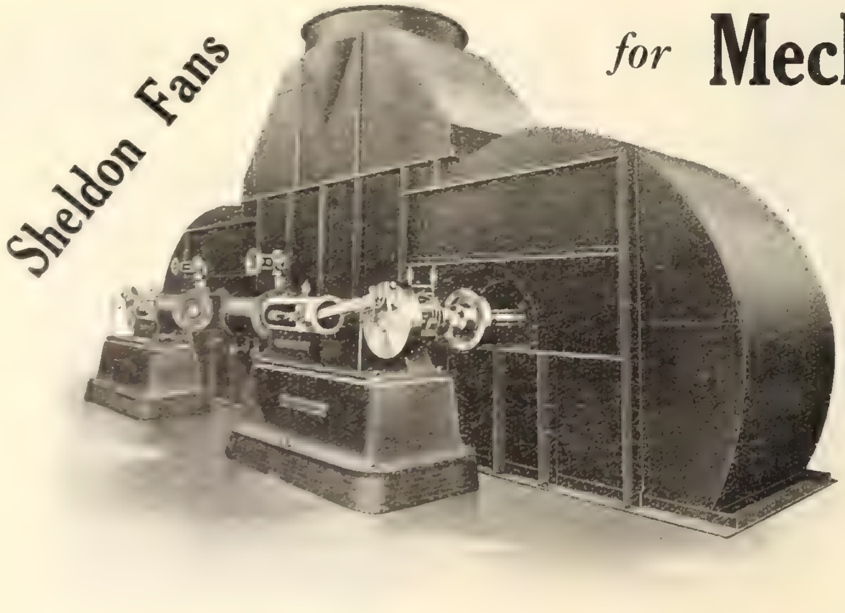

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Heating and Ventilating
Schools, Colleges, Public Buildings, Factories, Mines, Tunnels, etc.

They can also be used for exhausting Smoke, Fumes and Gases from Dye Houses, Chemical Factories, Mills, etc.

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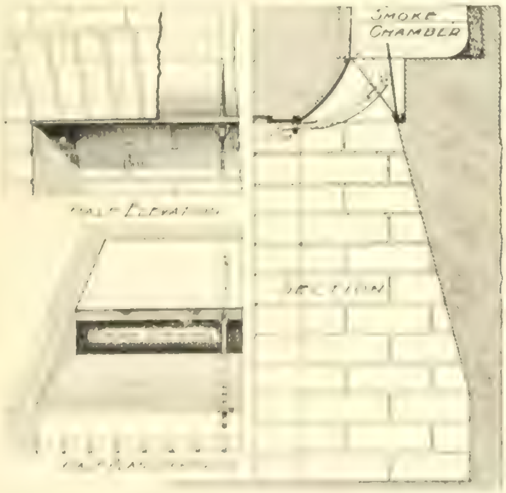

Forms lintel to support brickwork.

Presents smooth surfaces to lead smoke to flue.

Simplifies mason's work and saves his time.

Provides valve to regulate draft and ventilation.

Simply and strongly constructed.

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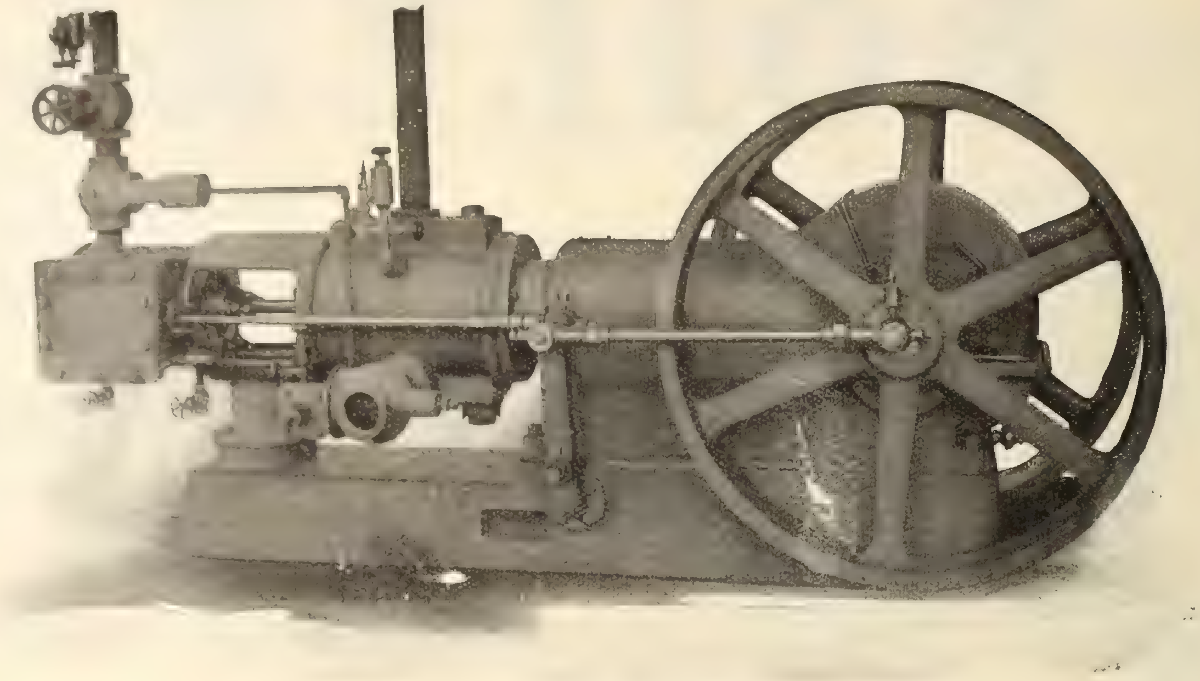

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With the rapidly advancing facilities for securing electric power for contracting work an *Electric Driven Compressor* is often more desirable than a *Steam Driven Unit.*

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Built in capacities ranging from 57 to 502 cubic feet free air per minute at pressures ranging from 15 to 100 pounds.

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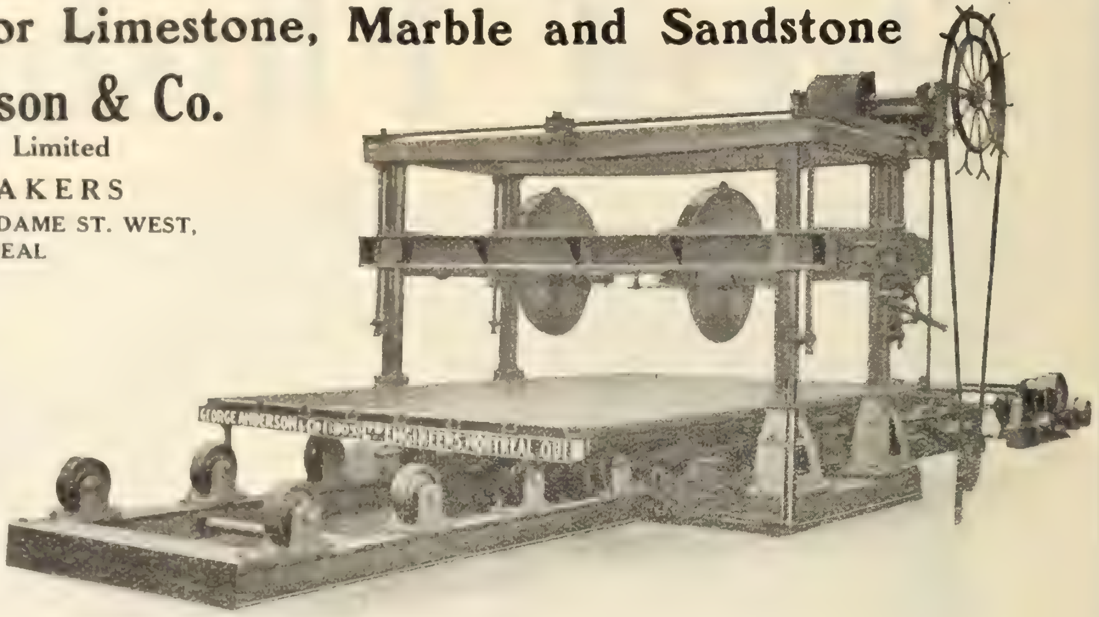

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We hold stocks of
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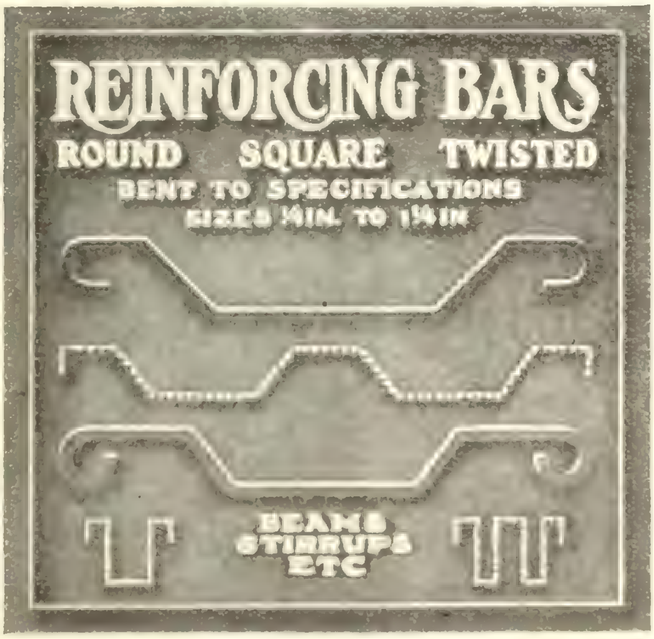

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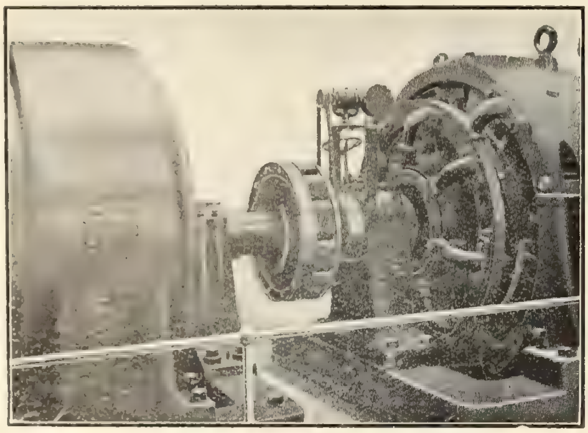

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Reinforced Concrete, by A. W. Buel. Published in 1906 by the Engineering News Publishing Company, New York. 500 pages, illustrated. Price $1.00.

The Sanitation of a Country House, by Dr. Harvey A. Bashore. Published in 1905 by John Wiley & Sons, New York. 98 pages, illustrated. Price 50c.

Modern Practical Carpentry, by George Ellis. Published in 1906 by B. T. Batsford, London. 372 pages. Price $1.50.

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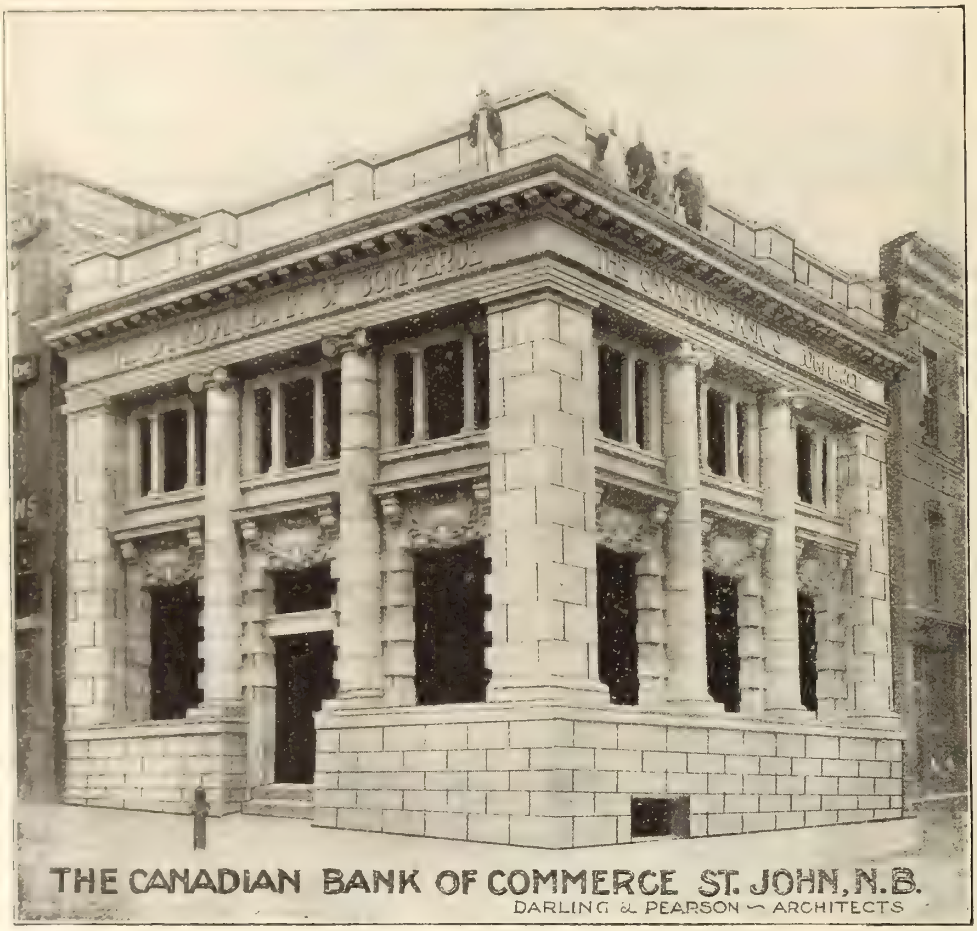

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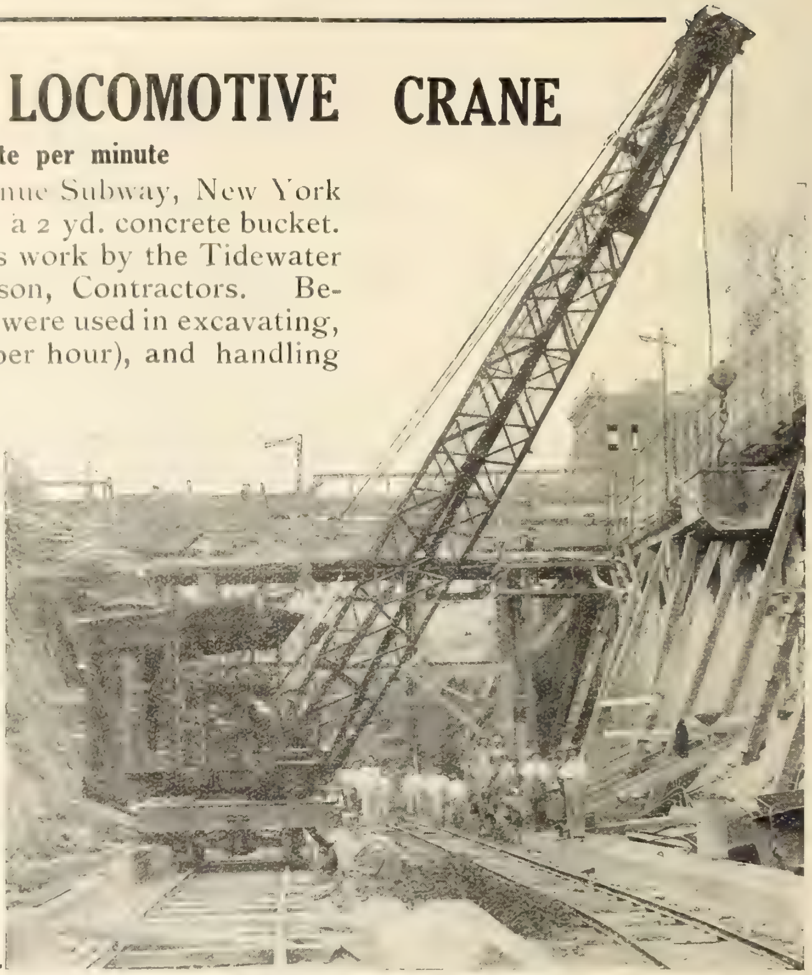

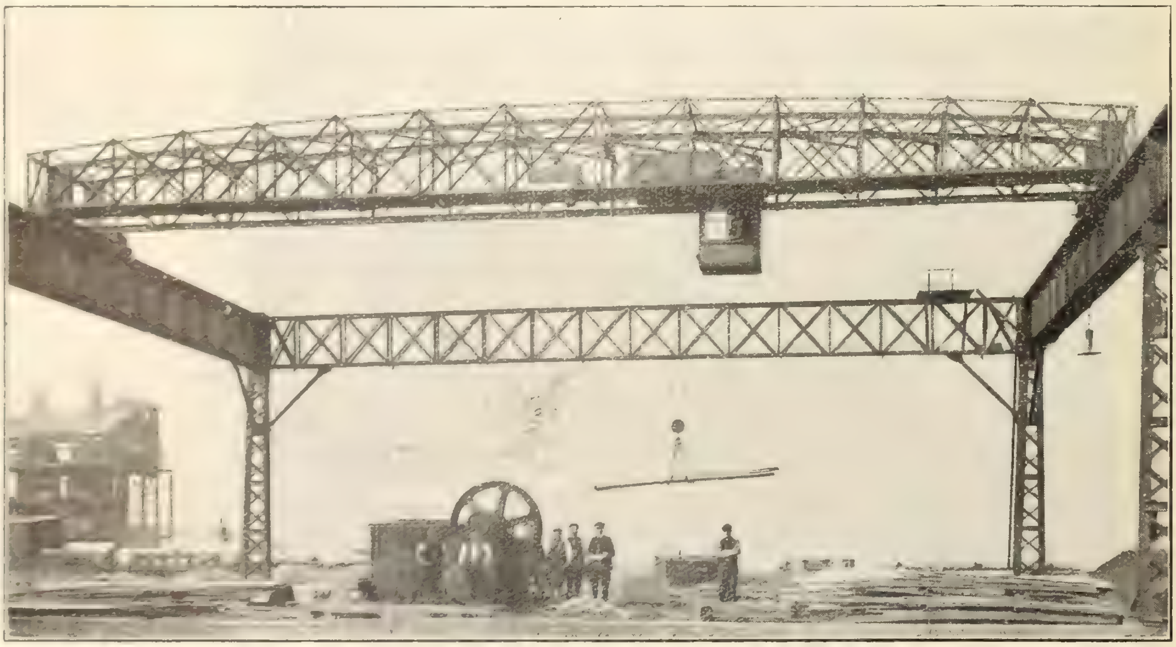

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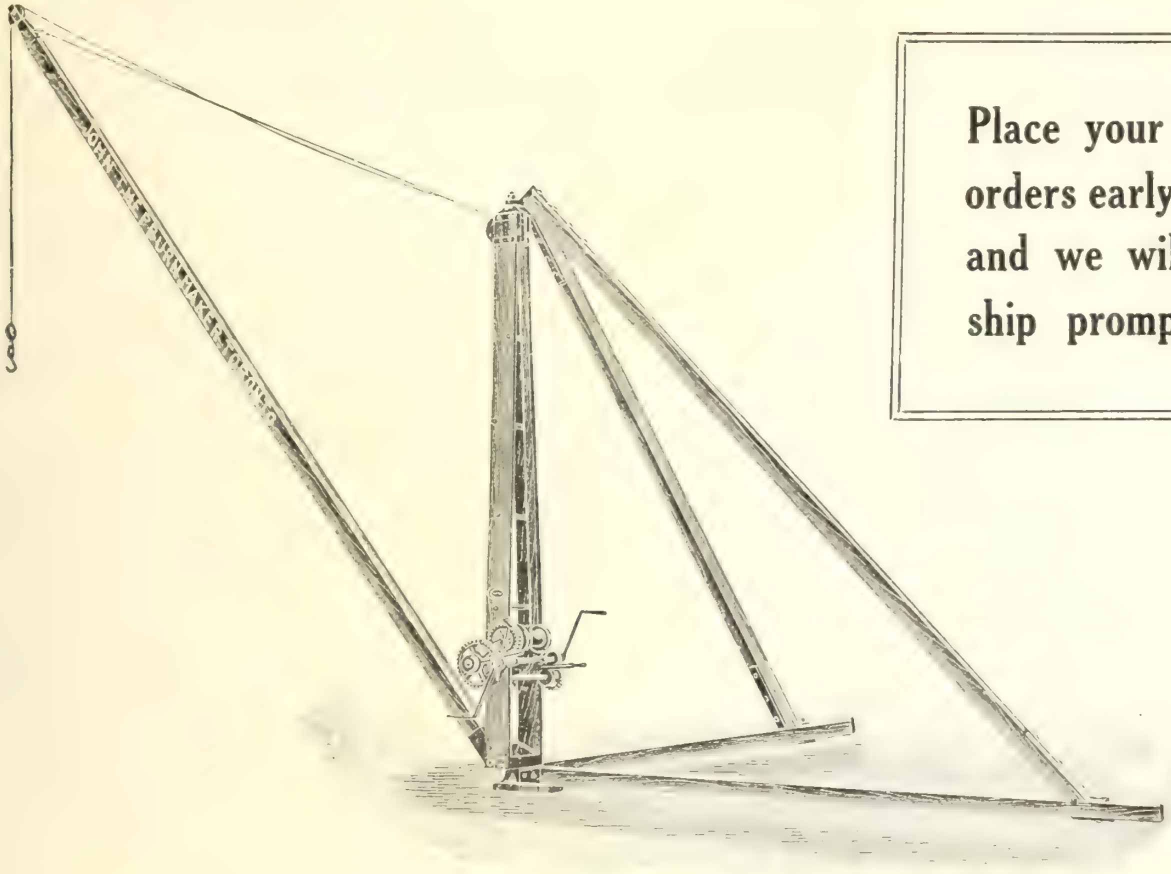
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This accounts for our receiving the larger portion of orders for engines used on this class of work.

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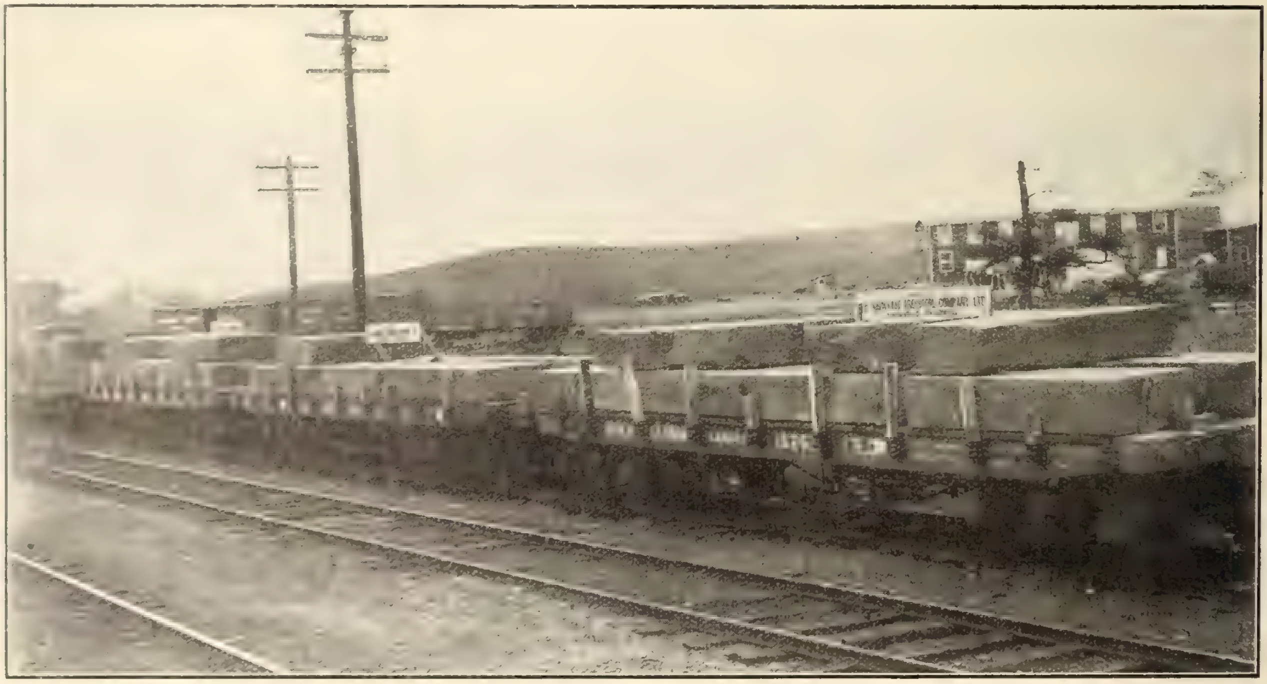

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PEDLAR

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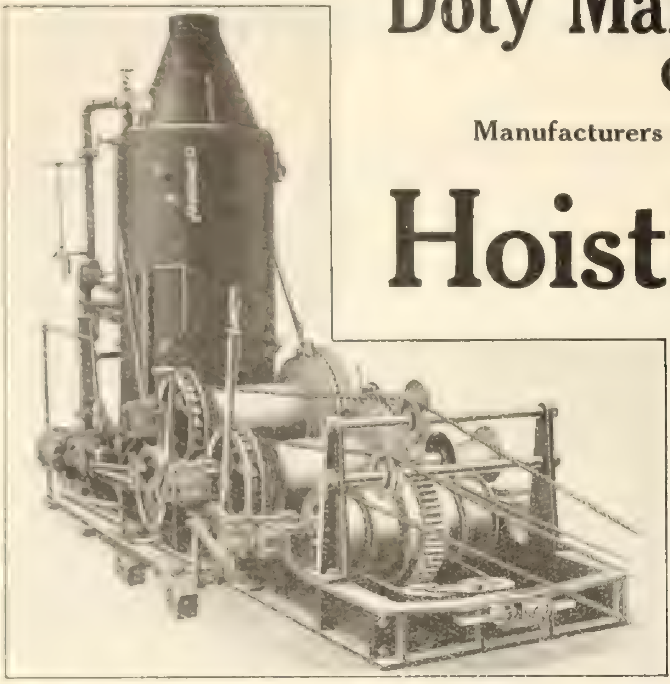
Company Limited

Manufacturers of **Superior**

Hoisting Engines



This cut illustrates our Standard Double Cylinder Double Drum Hoisting Engine with Derrick Swinger attached. "Superior to any other on the market." All parts constructed, guages and templates and every engine tested under steam.

Derrick Swingers, Material Elevators, etc.

for

Contractors, Mines and Quarrymen

A full line of Hoisting Engines, with Boilers to pass inspection in any province, kept in stock by The Doty Engine Works Co., Winnipeg, Man., and also at our

Works—GODERICH, ONT.

To buy our Engines is a Guarantee of Satisfaction

Save Time, Trouble and Money

By Using a

THEW SHOVEL

for that EXCAVATING CONTRACT

The contractor with men and teams cannot compete successfully with the man who owns a THEW SHOVEL.

THE REASON WHY

The smallest Thew does the work of from twenty to forty men at one-third of the cost. The Thew, being able to load a wagon a minute, will often save enough in team time to pay its entire operating cost, which means that you are loading dirt for practically nothing. Hand labor is difficult to secure, hard to hold and inefficient in practice, while the Thew is always on the job.

It will pay you to investigate this shovel. Write for our catalog, C. R. It will explain the numerous features which make the Thew the most practical and economical machine of its kind on the market and will give you valuable information regarding cost of excavating.

The Thew Automatic Shovel Company, Lorain, Ohio

A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

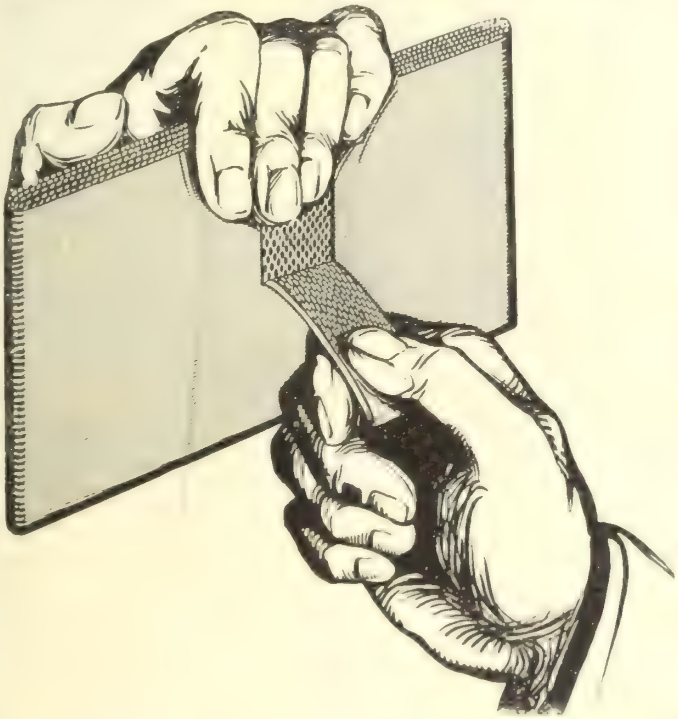
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

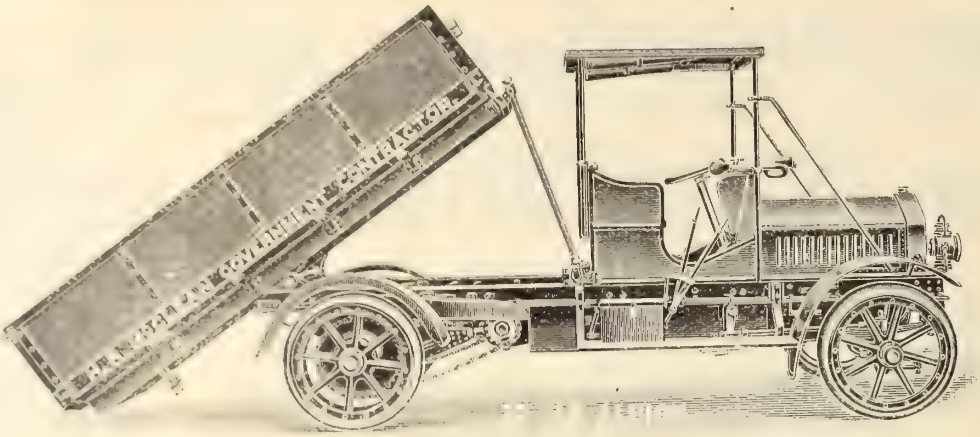
TWO HUNDRED AND FORTY ROLLS A TOTAL OF 72,000 FEET

We have just received an order for this quantity of GOODYEAR RUBBER BELTING [illegible]
of [illegible] elevators. Such an order [illegible] the quality of GOODYEAR Belting.
If we have not just the belt you require we will make it for you.
In the choosing of belts our booklet would be of great assistance to you. We supply it free. Write for it [illegible]

The Goodyear Tire and Rubber Company of Canada, Limited

Factory, Bowmanville, Canada

BRANCHES: Victoria, B. C. Vancouver, B. C. Calgary, Alta. Regina, Sask. Winnipeg, Man. London, Ont. Hamilton, Ont. Toronto, Ont. Montreal, Que. St. John, N. B.



Some Reasons Why You Should Buy

ALBION TRUCKS

1. THE ALBION MOTOR CAR COMPANY OF GLASGOW, SCOTLAND, on account of the reliability and economy of their Trucks have become the largest manufacturers of Motor Trucks in the British Empire.

2. TWELVE YEARS' EXPERIENCE OF TRUCK CONSTRUCTION in all parts of the world (sixty trucks in Canada) back of every "Albion."

3. ECONOMY IN FIRST COST. 12½ per cent. or about Five Hundred Dollars on a 3½ ton machine saved by British preference in duty and the machines manufactured where the highest grade of skilled labor and material can be obtained at low rates.

4. Tires of nearly double the size of those supplied on standard American machines, with the consequent large saving in operating cost, as tire maintenance is the chief cost of truck operation.

5. CAST STEEL WHEELS which last forever.

6. EASE OF CONTROL. There is only one lever and two pedals to control the machine. The gears are always in mesh and the engine is equipped with a powerful governor controlled from the driver's seat which enables the truck to be set to run at any speed up to the maximum, thus making the driving of the machine as simple as possible.

The majority of "Albion" Trucks are driven by former horse drivers.

PATENT DRY DISC CLUTCH which protects the mechanism from damage by poor drivers.

PATENT SPRING DRIVE in transmission to protect the tires from wear on rough roads.

7. ALBION SERVICE. WE WILL HAVE DEMONSTRATION TRUCKS AND COMPLETE STOCK OF SPARE PARTS in MONTREAL, TORONTO AND OTTAWA.

8. Recent order from the CANADIAN PACIFIC RAILWAY after report on the design and construction by their engineers.

9. The "ALBION" represents the MAXIMUM VALUE IN FIRST COST and the MINIMUM COST OF UP-KEEP. Let us prove this to you by examining the truck carefully and noting the many features that lead to reliability and long life in its construction. You will find Albion Trucks at all the Motor Shows completely opened up for inspection, as we believe there is no detail that will not bear the closest scrutiny.

See our Exhibit at the Toronto Motor Show, or
write for catalogue, particulars and demonstration

Albion Motor Car Co. of Canada

Montreal and Toronto

Complete stocks of spare parts carried in Canada

Contractors' Acetylene Flare Lights

Made in Two Sizes

SIZE NO 1—

8,000 Candle Power, operates 12 Hours on 18 lbs. Carbide.

Price F.O.B. Ottawa $95.00.

SIZE NO. 2—

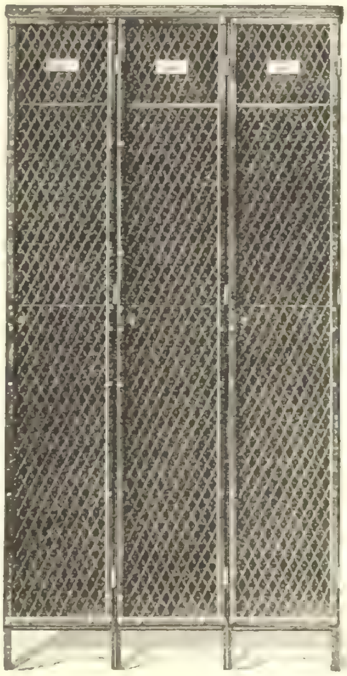
1,000 Candle Power, operates 12 Hours on 8 lbs. Carbide.

Price F.O.B. Ottawa $65.00.

Manufactured by

International Marine Signal Co.
Limited
Ottawa, Canada

'Meadows' Metal Lockers



Make friends because of their substantial construction and unique features. We make several styles and sizes of these lockers. We'll know what you want if you just hint at your requirements.

Send for our illustrated booklet entitled **"Locker Lore"**

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Toronto Wire, Iron and Brass Works Co. Limited
TORONTO, CANADA

Canadian Supply Company

220 King Street, West, Toronto

Distributors for
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STRENGTHENING
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¶ Estimates given on built up roofs of all kinds.

¶ We make a specialty of executing contracts for roofs in accordance with Barrett's specifications.

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15 Leaders of 15 Lines

We specialize on the following

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Nelson Bronze Iron and Steel Valves.
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Reliance Ball Bearing Door Hangers.
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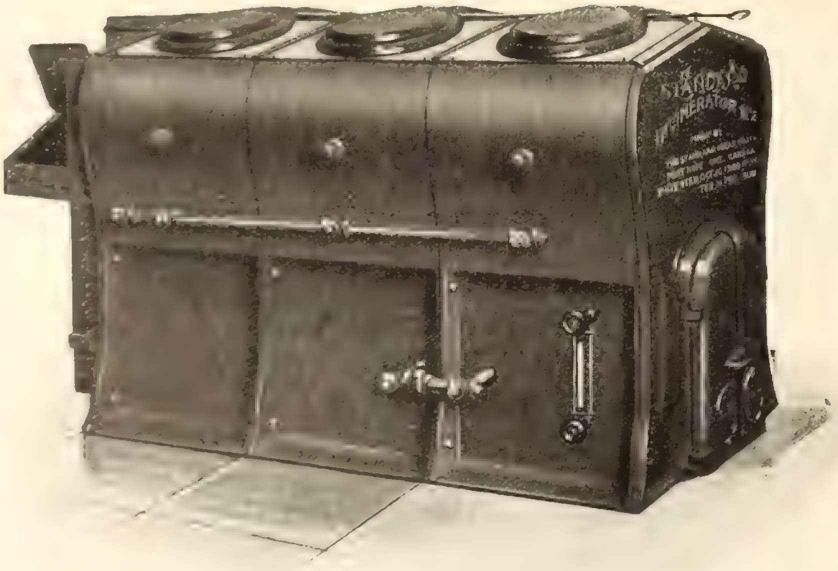
Builders' Supplies and Engineering Specialties
304 University Street, Montreal. Toronto, Confederation Life Building.



Three Section Incinerator—Type No. 2

Sewage and Garbage Incinerators

In Standard Ideal Incinerators the accumulation of the matter—both solid and liquid—is absolutely sanitary and non-infectious. The system of Incineration is complete—the solid matter being reduced to a small ash and the liquids completely evaporated.

It is important to note that in the latter process the system of drafts is arranged so that the fumes and vapors arising from the accumulation must pass through the fire before reaching the open air. This obviates all obnoxious odours.

The United States Government finally selected this type for the disposal of toilet refuse in its military camps and elsewhere, after trying every other apparatus on the market.

Standard Ideal Incinerators are made in two types:

TYPE No. 1 is intended for the use of 10 persons daily.

TYPE No. 2 is sectional; one section alone having a capacity for 25 persons daily. The addition of extra sections increases their capacity proportionately.

Write for booklet
"INCINERATION AND INCINERATORS.

The Standard Ideal Company Ltd.

PORT HOPE, ONTARIO
Branches: WINNIPEG TORONTO MONTREAL VANCOUVER

ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY
HUGH C. MacLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
VANCOUVER - Tel. Seymour 2013 - Hutchison Block
NEW YORK - Tel. 3108 Beekman - Tribune Building
CHICAGO - Graceland 3748 - 4059 Perry Street
BOSTON - - - Main 1024 - - - 643 Old South Building
LONDON, ENG. - - - 3 Regent Street, S.W.

SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

**Alphabetical Index of Advertisers
Page 16**

Vol. 28 February 19, 1913 No. 8

Our Best Traditions

IN the whole British speaking community there is no body of men whose heart has thrilled more responsively to the account of the tragic finale of the south polar expedition than the engineering profession. The pioneer in Canada is numbered in his thousands and those in particular who have roughed it in the earlier days of the Canadian Northwest will appreciate the enormous obstacles overcome by Captain Scott and his wonderful endurance to the last. As engineers, whether our work lie in the desolate places of the north and northwest, or within the shadow of old St. Paul's or Notre Dame, we are all in sympathy with the pioneer spirit that actuated Captain Scott, and we rejoice to think that that spirit was sustained in the polar explorer by the courage and chivalry that are inseparable from the traditions of our race.

The death of Captain Scott and his companions has been called a national disaster. With this we are not entirely in accord, for great ends and glorious achievements have nearly always called for great sacrifices, but if it be a disaster it will point the moral that great achievements are still worth while and that even in this day of commercialism there is attainment of a kind that may be disassociated from dollars and cents. We are reminded that apparent failure is the lot of some of the greatest and best men. The failure—if such it may be called—of Captain Scott will write his name in history and enroll him in the long and honorable list of England's heroes. One last thought is that Captain Scott, although anticipated by one man in an achievement of which men had dreamed for centuries, could render generous tribute to the success of his rival. There is ennoblement in the thought.

Men of the stamp of Robert Scott are not born in every generation and we who have been privileged to know something of the life and character and ending of such a man should profit by his wonderful example of intrepidity and self-sacrifice—an example of true manliness that must appeal to every field of human activity and influence it for the better.

"Not here! The White South has thy bones, and thou,
Heroic sailor soul,
Art passing on thine happier voyage now
Toward no earthly pole."

Toronto Not Altogether A City

SURELY in no other city of its size does there exist such an unsatisfactory state of affairs in regard to the building by-law as in Toronto! It is now nearly two years since the Citizens' Committee memorialized the council and now month after month goes by and enquirers can still obtain no better information:—the old bylaw is out of print and the new one has not yet become law.

The energetic work of the Citizens' Committee which has been detailed at various times in these columns should have been productive of more satisfactory results; it should have awakened in the authorities a desire to effect immediate reforms. As it is, little real effort is being made to get the revised by-law passed. The section of the by-law governing reinforced concrete construction went into effect last summer, but the remainder of the by-law is still in abeyance—awaiting action on the part of the Property Committee.

The City Architect's department has been shown up in a very unfavorable light—or rather, in a more unfavorable light than usual. No objection would be made to reasonable delay in measures affecting the constructional activities of a city which spends as many millions in a year as Toronto does, but the strongest objection must be made to the irresponsible shelving of such an important matter. The city council evidently does not appreciate its responsibility; neither, apparently, is the City Architect or the Property Committee capable of rising to the occasion—such an occasion—presented by a city approaching the half-million mark in population.

Toronto is assuming all the outward proportions of an important constructional centre, but in so far as its administration of building work is concerned, it is hardly beyond the village class, and certainly not qualified to compete with many progressive towns in the same province.

Bad Faith, Bad Economy

BAD faith with contractors has cost many a Canadian municipality thousands of dollars and now that the active constructional season of Canada's greatest year is approaching, it is timely to ask whether contractors, generally, should be invited to send in tenders if the intention of a council is to give the work to one or other of a favored few provided the amount is not glaringly extravagant.

It must never be forgotten that the preparation of a tender costs money, and sometimes a considerable amount of money. The total cost of unsuccessful tendering throughout the year comes to an enormous sum, which sum ultimately falls upon and increases the cost of the work done. There is no difficulty in [illegible] the situation, but at present our point is elsewhere. Take the case of a council seeking tenders without qualification. A contractor sends in a bona fide tender which is the lowest, another contractor does the same and is the third on the list; but the last is a local man, and the work is given to him because the council wants to keep the work in the place. Of course the work really is in the place, whether or no, and even in the success of a contractor outside the district very little of the money paid goes away. But the point is:—**why is the man who is not wanted allowed to tender at all?** Why is he asked to expend money to "save the face" of a set of councillors who do not intend to employ him under any conditions if they can possibly help it?

A small proportion of the councils of this country are notorious for their unjust dealings, and are a disgrace to local self-government. Unfortunately their evil doings lead to the general disparagement of all councils—and so municipal work suffers in the estimation of contractors. Graft is on the decline and every effort must be made to stamp it out altogether. If a contract is open to the world, it should be so, even at the risk of a few law-suits. If a council desire its work to be restricted to the city or province, let it honourably say so. Tell the outsider in the first place that he is not eligible. We hold strongly to the opinion that no contractor should be allowed to tender unless he have an equal chance with every other competitor of getting the work.

Contract Made by General Contractor Not Binding on Sub-Contractor

It is of interest for general contractors who are sub-letting work to note that in the eyes of the law the sub-contractor is not bound by the contract that the general contractor may make with the architect or owner, or by any other such arrangement. At Osgoode Hall, Toronto, last week there was heard a case in which the work involved was shown distinctly on the plans and marked but not properly specified, except for the general clause which reads: "All work not shown but specified, and vice versa, to be carried out, etc." This clause does not amount to the paper upon which it is written for the reason that it does not cover any extra work, but means anything required in the way of material and to complete the work as understood, specified and shown. This clause not infrequently serves as a cloak for the architect, and contractors have been intimidated into paying for the designer's omissions with their time and labor. In the case above-mentioned the owner's architect swore that the work in dispute was shown and intended though not specified, but the judge ruled otherwise and the general contractor's only possible chance lies in suing the owners.

The moral is that when a general contractor takes tenders on different trades, he should see that everything is covered, and make just as sound and binding a contract with the man under him as that existing between himself and the architect or owner.

JUDGING from present indications, there is likely to be a scarcity of lumber for building purposes during the coming season. Last year there was a big run on the common grades, owing to the high prices of the better descriptions, with the result that quotations advanced all along the line. This year manufacturers have again put up prices, and of course the cost of building will be proportionately greater. It will, in all probability, be impossible to substitute brick for lumber to any extent, as the demand for the former is pretty certain to be greater than the supply, notwithstanding the establishment of additional plants throughout the country. Last year many millions of bricks had to be imported, and as building promises to be more extensive than in 1912, orders for brick will no doubt be on a larger scale than ever before.

In the course of a paper on "Modern Steel Foundry Practice," read before a recent meeting of the American Foundrymen's Association, Mr. S. R. Robinson said that in acid practice the general construction has changed but little from the furnace of ten years ago. In building the usual 25-ton furnace it is now customary to put three rows of brick on the bottom plates and 18 in. of brick over the chill plates. The corners are not left square, but are "filleted," i.e., they are filled up with brick to prevent a breakout at this point. The chequers are independent of the furnace; that is, they do not support the weight of the furnace. All furnaces are built entirely above ground with the top of the flues on a level with the ground. The use of 50 per cent. ferro-silicon in place of the 11 per cent. alloy is general now; preferably in the furnace, but quite often in the ladle. Steam as an atomising agent for oil fuel, which is extensively employed, is very seldom used, as it is now generally acknowleged a mistake to think that there is a gain in heat through its dissociation. Small open-hearth furnaces are coming into more general use; that is, from 5 to 10 tons capacity. Heats of 12,000 lb. are now being made in this type of furnace, making 140 openings of the stopper and requiring one hour to pour. The life of such a furnace should be 500 heats without repairs.

The proposed bridge over the Red river, which is to be erected by the municipality of St. Boniface, under the supervision of Mr. M. P. Blair, City Engineer, to whom we are indebted for the accompanying details, is to cost $600,000. Tenders for the work closed on February 17th. The proposed structure will be 930 ft. long, having a 46-ft roadway, with two street car tracks and two 10-ft. sidewalks. There will be seven spans, consisting of two abutments and six piers, all the piers going to rock. Navigation facilities are provided in a Strauss bascule lift span, of two leafs, with ornamental counterweights. The bridge is of the half-through girder type, the girders acting as partition between the roadway and the sidewalk. At the time of writing further information was not available as the field design was not sufficiently advanced.

It took a pull of 364 tons to break the largest hoisting cable in the world, when sections were tested early in December in the 800,000 lb. testing machine of the Fritz Engineering Laboratory at Lehigh University, South Bethlehem, Pa. Three tests were made, all highly satisfactory. A portion of the cable that had been in use for a year and a-half withstood a pull of nearly 300 tons. The construction of this cable is said to be without precedent in rope-making. It consists of six strands, each of nineteen wires, twisted around an independent wire rope centre, this centre having six strands of nineteen wires each, twisted around a hemp core. The finished cable is 7810 ft. long, and weighs 125,360 lbs. Cars with a capacity of 100,000 lbs. of ore are lowered by means of this cable down an inclined plane 5800 ft. long.

Butuminous Gravel Concrete Pavements

Details of Construction Adopted by the New York State Highway Department—An Economical and Satisfactory Type

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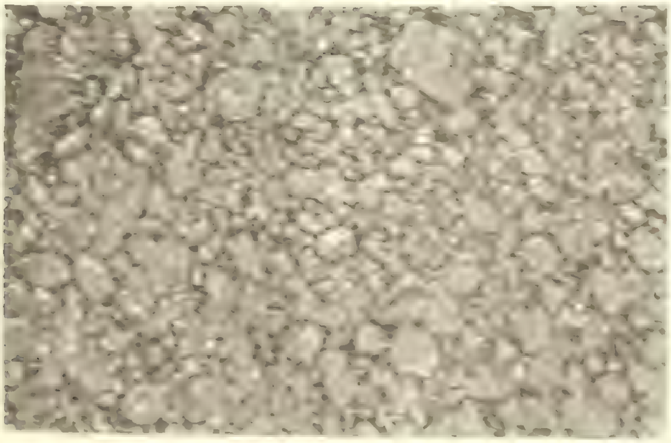

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expedient to have a small percentage of voids, thereby allowing the heat of the sun and the traffic to gradually consolidate the pavement, resulting in a comparatively smooth and even surface and avoiding the short wavy condition of pavements in which the mineral aggregate is fine and the bitumen in larger proportion to the mineral aggregate than in the above described specification. This theory has been substantiated in actual construction.

This gravel is composed of calcareous sandstone, granite and quartzite, associated with a considerable amount of finer particles of the above named rocks, together with a percentage of clay. This latter substance gives the gravel a good cementatious value, which is an essential to the comparative permanency of the pavement. The clay acts as a catalyzer on the asphalt, making it more viscous, less volatile and also less brittle.

The success of this pavement, in the writer's mind, is due to the physical qualities possessed by the gravel that was used as the mineral aggregate, the gravel being Hudson River Cementitious Gravel, of which there are many pits along the banks of the Hudson River and at least three that are developed commercially.

The nature of this material was brought to my attention, first by its general use on the parkway systems of New York City and many of the country roads on Long Island where it had been used very successfully as a water-puddled roadway until the advent of the motor vehicle.

The finished pavement

It occurred to the writer that if it was possible to use this material and obtain similar results with an additional element in its composition that would insure its resistance to motor traffic, that it would be an economical and desirable result.

I believe it will be generally conceded that a gravel roadway, when in condition, is as desirable and as comfortable a roadway to travel upon, especially for country and park purposes, as any that have been presented to the public.

This composition of gravel and asphalt retains all the agreeableness of travel and also retains the appearance of the original gravel road. At the same time it has the added feature of comparative stability and resistance to wear of other pavements that could be justly classified as those belonging to a city or a populous village.

Pavements of a semi-permanent nature, now commonly used in cities and villages, seem somewhat out of keeping with the surroundings when placed upon park driveways or country highways, being noisy, hard and unattractive.

This mixture of gravel and asphalt overcomes all these criticisms by being comparatively noiseless, resilient, easy riding, and conforming to our ideals of what should be the appearance of a country or park driveway, and in addition to this it possesses a feature which not only the driver of a horse, but also the users of automobiles can readily appreciate, namely, that it has a "non-skid" surface. Another feature of this pavement which has appealed to the writer is the lower cost as compared with other so-called permanent pavements.

The average price bid by contractors for a pavement 2½ ins. deep of this nature has been $0.85 per square yard. From reports of engineers in immediate charge of the different contracts, the percentage of profit has varied from 0 to 15 per cent. On this basis I consider an engineer's estimate for this work should be $0.85 or $0.90 per square yard under similar conditions of accessibility to the materials that compose the pavement.

The cost of the mineral aggregate averaged $3.25 per cubic yard on the site of the work.

The cost of the asphalt averaged $0.15 per gallon on the site of the work.

On one road the contractor erected a central plant at the railroad station, involving a cost of about $8,000.

On another road the contractor made use of a portable plant costing about $2,200. This plant was designed to carry the mixture by means of an extending arm from the mixer to the place where the pavement was being laid. This necessitated a constant shifting of the plant.

Another contractor used a portable plant, moving it on an average of 1,000 feet, and transporting his mixture by means of horse drawn steel carts. This last method I consider the most satisfactory and economical.

Where the above described ingredients can be obtained, I believe this form of pavement to be worthy of investigation and consideration: first, on account of its comparatively low cost; second, because of its adaptability to country and parkway purposes, due to the easy riding surface, and its conformity to our ideals of the surroundings of a parkway or country highway; third, on account of its non-slippery nature, it being practically a "non-skid" road.

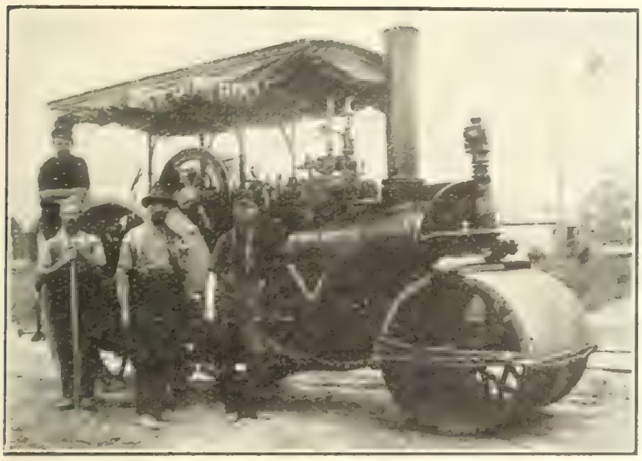
Examples of this pavement can be seen on Central Avenue from the northerly line of the city of Yonkers extending northerly towards White Plains for 2¾ miles (in this case the pavement was placed upon an old macadam foundation); on the south shore of Long Island in the village of Amityville, built upon a gravel foundation; on the south shore of Long Island in the village of Babylon, built upon a gravel foundation; on the road extending from East Hampton to Sag Harbor on Long Island, built upon a trap rock sand filled foundation.

The revised design for the Quebec bridge is so far advanced that details of the principal members are available. The main span is 1,800 feet long. The top chord members of the cantilevers will consist of double lines of 16-inch I-bars. The bottom chords will have the enormous dimensions of 7 feet height by 10 feet width. The length from panel point to panel point will be 86 feet; each full panel of the bottom chord for one truss will weigh 200 tons. Each cast iron base for the towers will weigh 500 tons. The stringers reaching from panel point to panel point are massive plate girders 10 feet in depth, each weighing about 60 tons.

Cost of Operating Steam Rollers

THE building of macadam highways, the two most expensive items are material and labor. Under the heading of labor, the cost of rolling is usually included. The cost of operating a steam roller depends upon the operator, the class of work he is doing, the cost and quality of his fuel and also upon the roller itself, its method of steaming and operating.

To absolutely determine the cost of operating a steam roller is difficult. To secure the most reliable information one must take an average covering various conditions and over long periods and that is what has been done in the following table:—



Steam roller in operation on Yonge Street

For Ten-hour Rolling

Fuel—	
Kindling wood	$0.05
Coal, 380 lbs. at $6.85 per ton	1.30
Water—	
60 gallons—Hauling three hours at, per hour, 50c.	1.50
Oil, etc.	0.05
Engineer—	
11½ hours at 30 cents per hour	3.45
	$6.35
Cost of rolling, 63½c. per hour	

For Ten Hours' Spiking and Scarifying

Fuel—	
Kindling wood	$0.05
Coal, 480 lbs. at $6.85 per ton	1.64
Water—	
300 gallons, hauling	2.00
Oil	0.05
Engineer—	
11½ hours at 30c.	3.45
	$7.19
Cost of spiking and scarifying, 71 9/10c. per hour	

In this age of notable construction, work which only a few years ago would have commanded world-wide attention, now is apt to attract not much more than local interest and comment. A case in point is the handsome railroad bridge, of the cantilever type, which has been built by the Pittsburgh and Lake Erie Railroad Company over the Ohio River, at a point about twenty-five miles below Pittsburgh. The total length of the bridge between back walls is 1,800 feet. The main cantilever structure, which measures 1,409 feet between centers of end pins, consists of a 370-foot end span, two 320-foot anchor arm spans, and a main span of the great length of 769 feet, which is made up of two 242-foot arms and a 285-foot suspended center span.

Hints on Constructing Cement Sidewalks

The following hints have been taken from a paper by Mr. N. E. Murray, presented at the last annual convention of the Illinois Society of Engineers and Surveyors:

Before constructing cement walks on a foundation that has been traveled over for several months, "pick up" the entire surface, flood and retamp it. The reason for this is obvious. On filling of this character the foot travel generally follows one well defined line, usually in the centre, which becomes solid and well packed and will not "settle' under additional weight; while the filling to either side of the center, on being given additional weight, usually settles sufficiently to cause a crack lengthwise through the walk, unless the entire surface is loosened and retamped to a uniform density before the concrete is put on.

A successful contractor states that in cold weather he mixes the concrete as dry as it is possible to have it, and then puts in the base in two courses, tamping each course separately—in this way obtaining a more uniform density in the concretes, and as a result has never had to record a "failure" in his work. Better results will be obtained and fewer walks with loose and cracked wearing surfaces would be seen if workmen could be made to understand that a wearing surface will not adhere to, or form a bond with, a base covered with loam or dirt, which they have "tracked" over it either through carelessness or in order to save a few steps.

Clean cut joints between the slabs and expansion joints adjoining the curbs at streets and alley returns, and at frequent intervals in long stretches of walk, are absolutely necessary if broken curb stones and broken slabs in the walks are to be avoided. Expansion joints at street and alley returns can be eliminated by constructing the curbing with a "recess" into which the sidewalks slab may be laid.

In the speech from the Throne, at the opening of Ontario legislature recently, the sum of $5,000,000 was mentioned as the amount which has already been provided for new Ontario road construction. It is understood, however, that this is only a small part of the general scheme. In all probability a survey will be made of the entire province and a provincial commission will be appointed to deal with the matter.

Recently greatly increased speed in piercing hard rock has been attained in the United States by the use of strong explosives in a particular way in a 7 ft. by 9 ft. irrigation tunnel. The holes were drilled 10 ft. to 12 ft. deep, using two short cut holes in the centre. The important feature consists in putting the strongest explosives obtainable at the bottom of the hole and in completing the charge with a weaker and cheaper quality. In this instance the best blasting gelatine was used in the lower end of the bore-hole, with 50 per cent. gelatine above it, and the primer was placed in the stronger explosive, 10 ft. clean per round being blown out. This method of using explosives is said to give with the best effect the maximum of economy.

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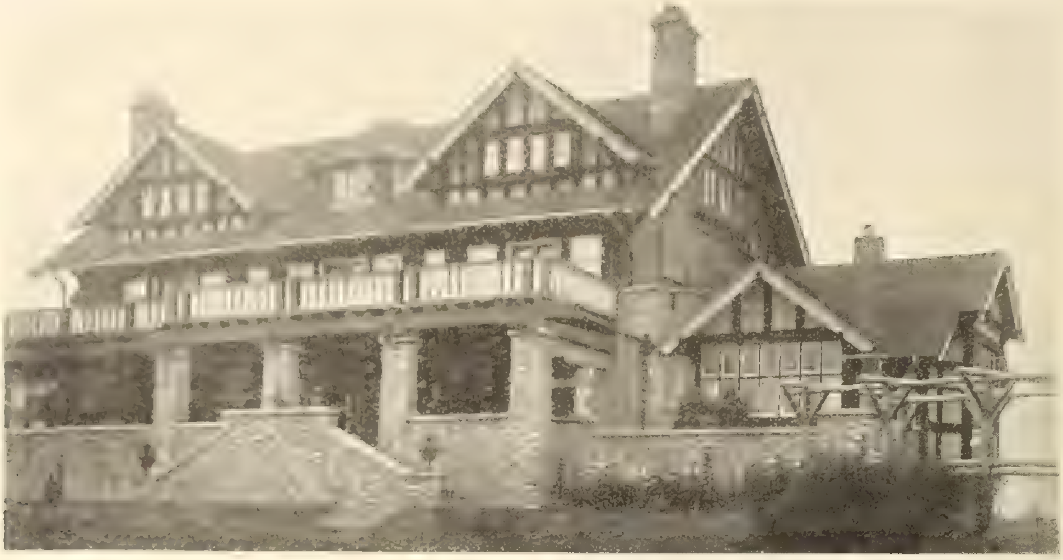
* Of James, Loudon & Hertzberg.

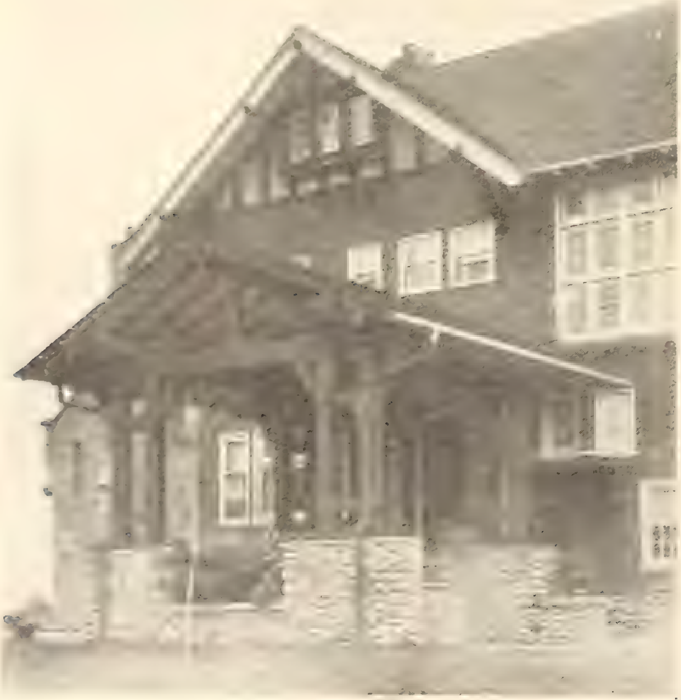


"The House at Barnaby"

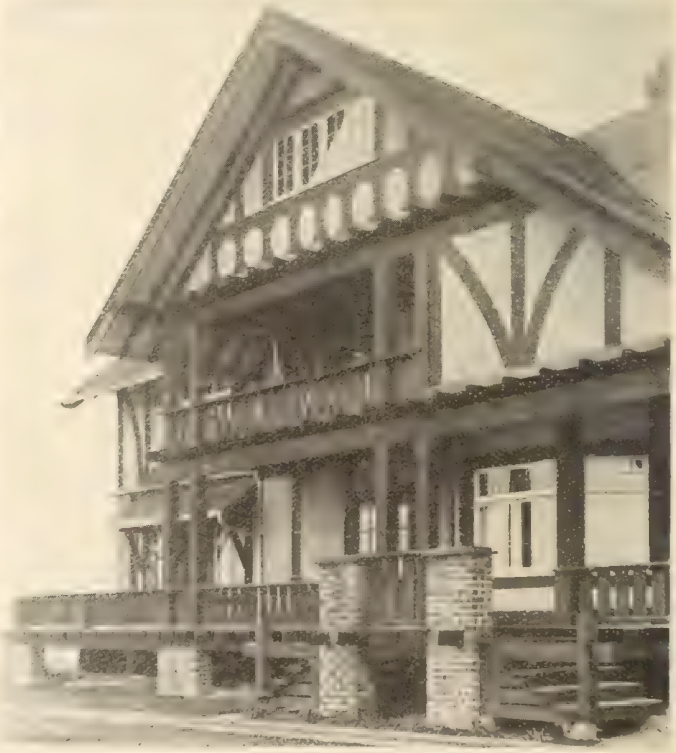
The Design of West Coast Houses

By R. McKay Fripp, F.S.A., Vancouver

In designing a house for the West Coast, the architect has to deal with many conditions which differ greatly from those prevailing in the east. The contrast in climate is, of course, one of the greatest of these differences and exercises a considerable influence upon the plan, but the principal difference, and one which might be expected to have an even wider effect upon design, is to be found in the various building materials available. These are almost as dissimilar in cost and character to those found in Montreal or Toronto as they well could be. The only stone commonly available here for basement and foundation walls exists in the form of irregular boulders of granite—usually too large to be used without splitting—and excellent work is done by laying the broken and roughly squared stone in irregular courses. A popular description of stone work, but one opposed to all the ethics of true masonry, is executed by laying the stones in a sort of crazy patchwork, without bond, and finished with a prominent



Porte Cochere at "Fairacres," Vancouver



Residence of Mr. A. J. Dana, Vancouver

tape joint. When these large boulders are not procurable—for though almost omni-present in newly cleared land and often in very great quantities, there are none the less patches and areas of land where they are scarce and sometimes, indeed, absent—concrete is the usual substitute, gravel or crushed rock being usually available. Quarried granite is too expensive to be considered in every-day work. Bricks, owing to their excessive cost, are not used very extensively except for chimneys, piers, porches, terraces, steps, etc. Common bricks cost about $16.50 " on the job " —and uncommonly 'common' bricks they are at that. For any facing brick of sufficient quality to resist weather and give a presentable appearance, $25 to $35 must be paid, and prices range right up to $150 a thousand for a really fine brick of good shape and perfect color:—the sort of brick that can be laid up in white mortar with a ¾-inch joint well raked out and look like brickwork, and not like painted and striped smooth plaster. It costs, upon the average, $12 to lay 1000 bricks, not including the cost of mortar. Roofing tiles have been used, but at such a price as $25 per square on the roof they are not likely to come into very general use. Hence shingles remain our stock roof covering. The exterior frame is shiplapped, covered with paper and enclosed with some form of rustic, shingles or plaster in the manner that may be seen in the four quarters of this continent. The interior finish is much the same as that of eastern dwellings of corresponding type, though of course our native woods, fir and cedar, are much more in evidence than imported hardwoods, and the cost of labor always acts as a restraint on the freedom of the pencil.

Residence of Mr. A. J. Dana, Vancouver

Stable attached to the Dana residence

The relative mildness of the climate renders the porch, balcony and sleeping porch more distinctive features than is the case east of the Rockies. Sometimes they enter largely into the plan and form prominent, almost governing, features of the design. The eaves, too, are often given a slightly exaggerated projection.

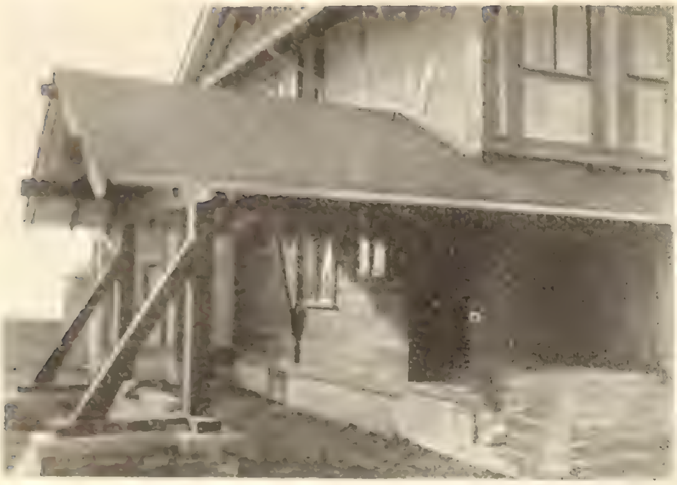
The " effect " of half timber is frequently resorted to for external treatment and now and then is copied or reproduced faithfully enough, but without regard to the fact that this form of decoration in no way truthfully represents the form of construction, from which it certainly does not spring. Broad weather boards, with the resawn surface exposed and stained, are beginning to take the place of the once ubiquitous very narrow, rustic painted, grey. Roof and wall shingles are latterly nearly always stained. The hideous tar black roof so common here a very few years ago is now fortunately seldom seen in new work.

It can scarcely be claimed, in the writer's opinion, that a style peculiar to or characteristic of the west coast has yet been evolved, or that there are many indications that the existing conditions will soon produce such a style. Certainly neither the distinctiveness nor the distinction of a certain type of Southern Californian dwelling has yet appeared to give local expression to local conditions.

Absence of cheap sound brick of good color and shape; the want of an ample supply of easily worked free stone—a rapidly disappearing asset—in the form of field or boulder granite; unlimited resources in splendid timber of two principal varieties, fir and

Residence of Mr. J. N. Ellis, Matthews Ave., Vancouver

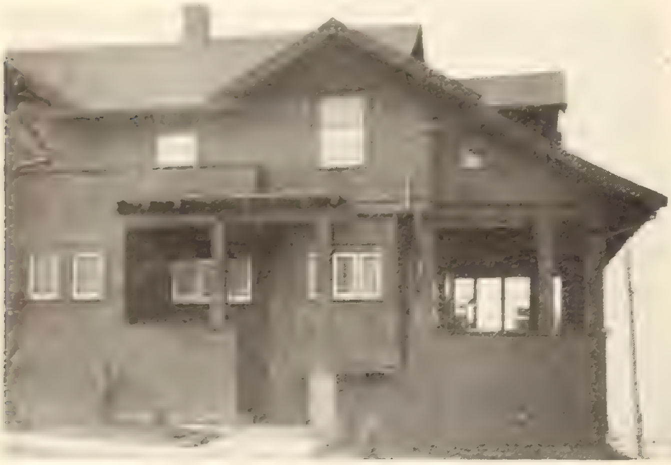
Mrs. H. L. Radermacher's bungalow



Residence of Mr. J. N. Ellis, Vancouver

today neither roofing tiles nor slates, except in imported quantities so small as to be negligible as building resources; a steadily improving plastering trade, and probably the highest priced labor in the world—but positively not the most highly skilled, may be accepted as a tolerably fair summary of our leading advantages in the matter of supplies. To what extent are they mirrored in our residential architecture? Have we produced work which might not be equally charisteristic of any other but no particular section of the continent? In short, have we entered upon the creative period? It is to be feared that the Candid Critic will declare that if we are anywhere it is in the imitative stage, and—alas!—the copying age is stated to be quite the worst of any period of Art. Amid a weary waste of the hopelessly nondescript there are excellent examples of Colonial, Dutch Colonial, Georgian and the English Country House. But the House of British Columbia—the land of huge timber trees and colossal rocks—where is it?

The writer, sharing the Candid Critic's admiration for much of his fellow craftmen's clever handling of many exotic styles, feels, also with the C.C., that it is time we began to dress our children in a native cloth. For some while past he has endeavored, with what success others must judge, to build according to the measure of the means: to make in timber houses that material the dominating note; taking the stone as it came out of the ground upon which the structure stands and using it in some such manner as in the **House at Burnaby**; taking plain square timbers and leaving each piece to explain its purpose and use as openly as in the **Porte Cochere at "Fairacres,"** or in the balconies, porches and pergolas of **Mr. A. J. Dana's residence** on Mathews avenue, and in the stable attached to that house; or in the manner of the application of post and beam in another recently completed residence, **that of Mr. J. N. Ellis** in the same avenue (see illustrations).



Dr. Richardson's house at English Bay, Vancouver

A combination of brick piers, timber posts and exposed beams with 24-inch shingles, laid 8 inches to the weather on roof and walls, is shown in a bungalow built for Mrs. H. L. Radermacher, and lastly, (9), Dr. Richardson's residence on English Bay is the first instance of the writer's attempt to build, in Vancouver, an all-shingled house " right on the corner of the street," with the least observance of the forms which are merely conventional.

In none of these instances must exterior plastering be supposed to represent intentionally the traditional " half-timber " work. These walls are simply cement-plastered walls, rough-cast, with the necessary angle boards. The "trim" of the openings and water-tables is emphasized to form plaster panels framed with protective timber. This treatment cannot fail to bear unintentional resemblance to genuine " half timber" construction. This, possibly, is more or less unavoidable, but it is not a mere imitation; moreover, the attempt illustrated by these photographs is by no means fully developed or considered, even by the author, as " a last word." The idea is to work logically along the lines of the aphorism:—" Decorate your construction; do not construct your decoration."

Largest Embankment in Germany

AFTER eight years' strenuous work the Mauer embankment has been completed. This, the largest engineering monument in Silesia, and at the same time the biggest embankment in Germany, is situated in the Bober Valley between Hirschberg and Lahn, at a widening of the river where the Bober describes a strong reflection.

The masonry dam has been erected on a rock soil, at about 66 feet depth; it is 196.8 feet in height, and at the bottom of the river 164 feet in width, and withstands a pressure of 440,920,000 pounds. The masonry on the side turned toward the water is provided with a cement coating reaching down to the ground, to prevent any water from penetrating into its interior.

The interior of the wall comprises shafts and galleries; it is at the surface 918.6 feet in length and 24 feet in width, and contains about 327,000 square yards of masonry. Being so exceptionally substantial, the dam will, it is firmly believed, check the most dangerous of Silesian rivers.

Upward of the masonry dam an artificial lake 5.6 miles in length will be formed, the embankment controlling a precipitation area of 463.3 square miles. The artificial lake will be 600 acres in area and 153.8 feet in maximum depth.

This embankment will be utilized on a large scale for supplying power to a considerable district of Silesia. The huge power house stands close to the outside of the embankment wall and comprises four turbines, each of 1,800 horse-power. As, however, this power house is connected with that of the Queis Valley embankment, near Marklissa, a total of 10,700 horse-power will be available, which suffices to supply the whole district of Liegnitz with electricity for lighting and power purposes.

Twelve-Storey Office Building for Winnipeg

EARLY in the spring, operations will be commenced on the Prudential Trust Building, Winnipeg, plans for which have been prepared by Messrs. Ross and Macdonald, Montreal. The contract has been let to the Geo. A. Fuller Company, Limited, of Montreal and New York, and it is expected that the structure will be ready for occupation by the 1st of May, 1914. It is to occupy one of the most prominent sites in Winnipeg, at the intersection of Garry Street and Ellis Avenue, within an approximate radius of 200 yards of the business centre of the city, covering an area of about 6,000 square feet. The building is to be twelve stories in height, or approximately 160 feet above the street level and nothing but fireproof materials being used throughout. The structure itself is composed of steel, concrete, terra cotta, tile roof, stone, and the only non-fireproof materials used are those of the doors and finish around same, which are to be of selected oak. The corridor floors, wainscots, and the trim around all corridor doors are to be of Canadian marble. The stairways are to be constructed of marble and of iron, and materials of a non-fireproof nature have been almost entirely eliminated.

Proposed Prudential Trust Building, Winnipeg

The exterior will be of Indiana limestone and granite, and the importance of the ground floor has been emphasized by a series of ornate arcade openings continuing around the building. On the two street fronts, between the arches, are single massive columns, giving the appearance of strength and solidity necessary to a building of this height.

Three high speed passenger elevators are to be provided, with stairs from basement to roof, to afford ready transit and easy access to the different floors throughout the building. The total cost of the building and site complete, will amount to approximately $860,000.

The structure is being erected by the Winnipeg Northern Realties, Limited, the directors of which are: Messrs. Jas. Playfair, of Midland, Ont.; B. Hal Brown, of Montreal; Jas. Carruthers, of Montreal; W. J. Morrice, of Montreal; Henry Timmis, of Montreal; Geo. W. Head, of Winnipeg; A. R. McMaster, of Montreal, and F. H. Manley, of Montreal.

Rusting of Iron

IN some very interesting experiments by two German chemists, E. Liebreich and F. Spitzer, the cause of rust in cases which have seemed especially puzzling has been made very clear—as it was shown beyond question that the rust was caused by the paints themselves. They painted polished steel plates, and in order to distinguish them, numbered them with oil paint. The result was that the rusting took place just under the painted numbers—that is, where the "protective" coating was the thickest.

They went further in the matter, and examined iron business signs and the like. As a rule these were made of sheet iron, first painted with a ground color—mostly white; then the lettering was added, usually in black. Removing the coating, it was shown that the rust was most pronounced under the lettering; in fact in most cases was to be found only there.

This set the investigators to thinking; and they carried out their experiments with several kinds of paint, as follows: white lead; zinc white (purest zinc oxide); red lead; iron oxide; white lead and lampblack; zinc white and lampblack.

Iron plates were brightly polished and four plates coated with the above paints, in different thicknesses of each, one plate getting but one coat, a second two, a third three, and a fourth four; time for drying being accorded. Then all the plates were subjected for a whole day to the action of the steam from water boiling in an open vessel (that is, under no pressure above that of the atmosphere).

The paint was then dissolved off to show the condition of the plates.

The result was surprising. Under all the single coatings the iron was not at all rusty; under the double coat, partly attacked; under the triple coat, more strongly; and under the four coats, thoroughly rusted!

Apparently one coat—at least of the above-named paints—is better than more. The explanation of this remarkable result would seem to be that the varnish in the second coat dissolves and loosens the first one, making it porous; and that the oftener this process is repeated, the more porous the paint becomes. It would also seem to indicate that one thick coat, if allowed to harden, would be better than several thin ones which has not been considered to be the case. There seem to be no experiments in this particular on record.

A great increase in building operations is disclosed by the January returns of the leading Canadian cities. Thirteen eastern cities spent the sum of $2,605,119, as against $1,371,912 in January, 1912, and fifteen western cities spent $3,293,584, as against $1,980,450. This makes the last month's total for eastern and western cities $5,898,703, as compared with $3,352,362 for the corresponding month last year—an increase of $2,546,341, or 75 per cent. Of the larger cities, Toronto registered an increase of 65 per cent.; Vancouver, 178 per cent.; Winnipeg, 9 per cent.

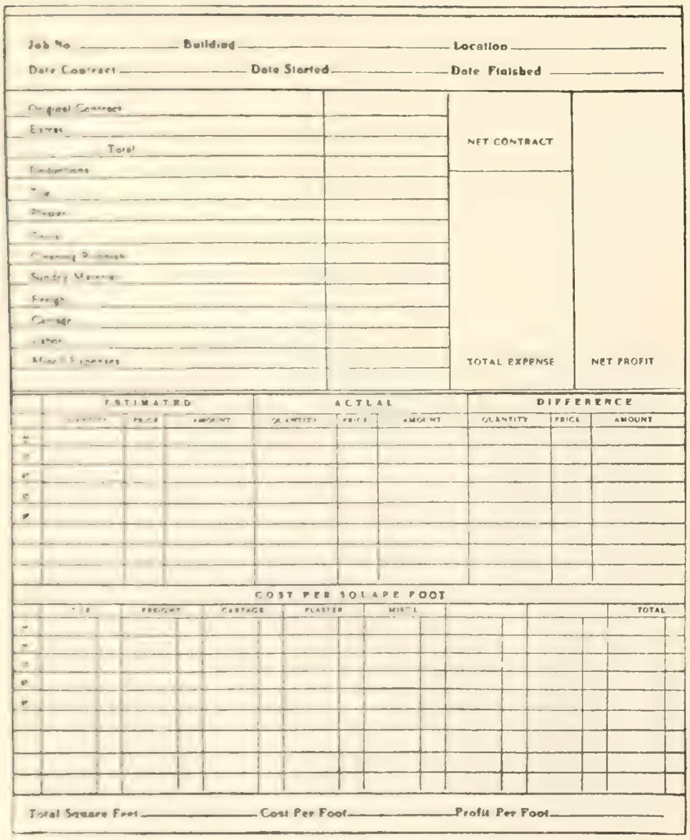
Uniformity in Architectural Symbols

ON the opposite page we reproduce a set of architectural symbols which were the subject of a recent contribution to the American Society of Engineering-Contractors by Mr. W. W. LaChance of Saskatoon, Sask. The architectural symbols are the conventional representation adopted by the Saskatchewan Association of Architects last October. The electrical symbols are those of the National Electrical Contractors' Association while the others are compiled from various sources by Mr. LaChance who sees no valid reason why the symbols should not have a prominent place among the Standards and advises the architectural profession to take concerted action and adopt some uniform chart. The methods in use at the present time have no uniformity and it is evident that there would be considerable advantage in the adoption of distinctive symbols indicating clearly the various materials that enter into construction work.

Keeping Costs in Building Construction

THE form reproduced herewith shows the method adopted by one firm for keeping a record for each separate job. It will be noticed from the details of the form that this particular arrangement was intended to take care of work in the application of fireproofing tile and incidental plastering, but the principles shown here can, of course, be applied to any particular department of building construction.

The form is desirable in that it records what the estimated costs were, and against them what the actual costs were, showing the factor of error, which is very useful in making a better guess on the next job of the same sort. The form is issued in triplicate, the first copy going to the sales department, the second being attached to the original estimate, and the third being filed to the name of the customer. The second form is therefore available when the job is completed for filing by subject so as to be readily available in figuring another job of that general class.



Job No ____________ Building ____________ Location ____________

Date Contract ____________ Date Started ____________ Date Finished ____________

Original Contract		NET CONTRACT	
Extras			
Total			
[illegible]			
Tile			
Plaster			
[illegible]			
[illegible]			
Sundry [illegible]			
Freight			
Cartage			
Labor			
Misc'l Expenses		TOTAL EXPENSE	NET PROFIT

	ESTIMATED			ACTUAL			DIFFERENCE		
	Quantity	Price	Amount	Quantity	Price	Amount	Quantity	Price	Amount

COST PER SQUARE FOOT

	Tile	Freight	Cartage	Plaster	Misc'l			Total

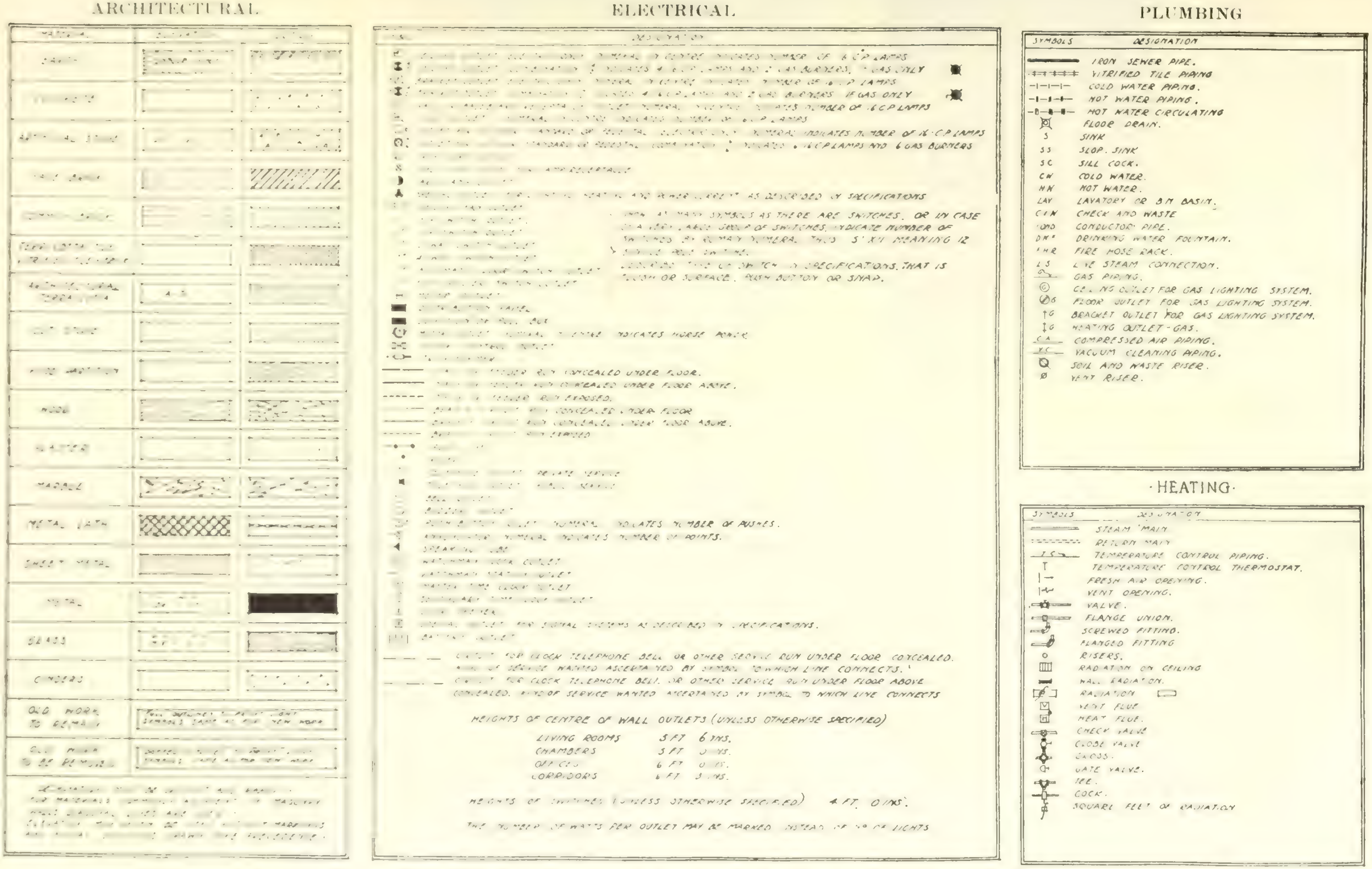
Total Square Feet ____________ Cost Per Foot ____________ Profit Per Foot ____________

Cost Record Form for Contractors

Heating a building by means of steam pipes embedded in the concrete floor has been successfully accomplished in the chassis testing building of the Moline Automobile Company, Moline, Ill. The structure is 120 ft. long by 60 ft. wide, with door openings extending completely across the ends of the building. The workmen are obliged frequently to lie on the floor in making necessary repairs and adjustments, and on this account it was desired to keep the floor surface comfortably warm. To accomplish this 1¼ in. steam pipes spaced 42 in. on centres were laid 2 in. below the surface of the 6 in. floor slab. The concrete is reinforced locally against cracking, due to the expansion of the steam pipes, by corrugated galvanised iron pipes enclosing the former. Below the floor slab 8 in. of cinder fill are placed as an insualting material. It is stated that with only five small metal radiators additional it is possible to obtain a uniform temperature of 65 to 70 deg. Fah. throughout the building.

The mechanical department of the Cedar Rapids and Marion City Railway, Cedar Rapids, Ia., has designed and built a fireproof oil and waste cabinet for use in the different departments of its shop where oil and waste are required. The advantage in the design is found in its simplicity and comparatively low cost. The cabinet consists of a ⅛ in. sheet steel case, 26 in. by 26 in. by 70 in. in size, reinforced at the corner by 1 in. by 1 in. by ⅛ in angles. The inside of this case is fitted with two shelves supported on 1 in. angles. The one across the door opening is turned so that the leg extends above the level of the shelf to form a shallow bin. The upper shelf is made into a clean-waste storage bin by riveting a plate across the opening so as to enclose the lower one-third of the shelf. The bottom shelf or floor of the cabinet may be used for storing oil and grease cans used in regular work, and the middle shelf is used for storing light oil in cans and oilers. The cabinet is fitted with a door pin hinged at four points, and provided with a strap-iron latch.

The results of some extensive experiments on the action of electricity on concrete were presented at the last convention of the National Association of Cement Users in Pittsburg. A report is contained in the Electrical World, of New York. It appears that on unreinforced concrete the only effect is a migration of the water-soluble elements. Non-reinforced concrete buildings are therefore immune from trouble arising from stray earth currents. They might, however, be injured by the earthing of cables carried in conduits embedded in the concrete, since these conduits would then act as electrodes. It is recommended that waterproofing membranes should be applied to the surface of reinforced concrete in preference to adding waterproofing substances to the concrete itself as preventives of electrolysis. Painting or otherwise coating iron with an alkali-resisting metal preservative before embedding it in concrete may serve to minimise the dangers of electrolysis, but no such coating has been found that does not prevent the formation of the bond between the concrete and iron when the concrete sets.


ARCHITECTURAL
METAL LATH
SHEET METAL
GLASS
CINDERS
OLD WORK TO REMAIN
OLD WORK TO BE REMOVED
ELECTRICAL
SHOW AS MANY SYMBOLS AS THERE ARE SWITCHES. OR IN CASE OF A VERY LARGE GROUP OF SWITCHES, INDICATE NUMBER OF SWITCHES BY ROMAN NUMERAL. THUS S' XII MEANING 12 SINGLE POLE SWITCHES.
DESCRIBE TYPE OF SWITCH IN SPECIFICATIONS. THAT IS FLUSH OR SURFACE, PUSH BUTTON OR SNAP.
CIRCUIT FOR CLOCK TELEPHONE BELL OR OTHER SERVICE RUN UNDER FLOOR CONCEALED. KIND OF SERVICE WANTED ASCERTAINED BY SYMBOL TO WHICH LINE CONNECTS.
CIRCUIT FOR CLOCK TELEPHONE BELL OR OTHER SERVICE RUN UNDER FLOOR ABOVE CONCEALED. KIND OF SERVICE WANTED ASCERTAINED BY SYMBOL TO WHICH LINE CONNECTS
HEIGHTS OF CENTRE OF WALL OUTLETS (UNLESS OTHERWISE SPECIFIED)
LIVING ROOMS 5 FT 6 INS.
CHAMBERS 5 FT 0 INS.
OFFICES 6 FT 0 INS.
CORRIDORS 6 FT 3 INS.
HEIGHTS OF SWITCHES (UNLESS OTHERWISE SPECIFIED) 4 FT. 0 INS.
THE NUMBER OF WATTS PER OUTLET MAY BE MARKED INSTEAD OF NO. OF LIGHTS
PLUMBING
SYMBOLS
DESIGNATION
IRON SEWER PIPE.
VITRIFIED TILE PIPING
COLD WATER PIPING.
HOT WATER PIPING.
HOT WATER CIRCULATING
FLOOR DRAIN.
S SINK
SS SLOP. SINK
SC SILL COCK.
CW COLD WATER.
HW HOT WATER.
LAV LAVATORY OR BM BASIN.
C & W CHECK AND WASTE
COND CONDUCTOR PIPE.
DWF DRINKING WATER FOUNTAIN.
FHR FIRE HOSE RACK.
LS LIVE STEAM CONNECTION.
GAS PIPING.
CEILING OUTLET FOR GAS LIGHTING SYSTEM.
G FLOOR OUTLET FOR GAS LIGHTING SYSTEM.
G BRACKET OUTLET FOR GAS LIGHTING SYSTEM.
G HEATING OUTLET - GAS.
CA COMPRESSED AIR PIPING.
VC VACUUM CLEANING PIPING.
SOIL AND WASTE RISER.
VENT RISER.
HEATING
SYMBOLS
DESIGNATION
STEAM MAIN
RETURN MAIN
TC TEMPERATURE CONTROL PIPING.
T TEMPERATURE CONTROL THERMOSTAT.
FRESH AIR OPENING.
VENT OPENING.
VALVE.
FLANGE UNION.
SCREWED FITTING.
FLANGED FITTING
RISERS.
RADIATION ON CEILING
WALL RADIATION.
RADIATION
VENT FLUE
HEAT FLUE.
CHECK VALVE
GLOBE VALVE
CROSS.
GATE VALVE.
TEE.
COCK.
SQUARE FEET OF RADIATION

Architectural, Electrical and Plumbing Symbols compiled by Mr. W. W. LaChance, Saskatoon, Sask.

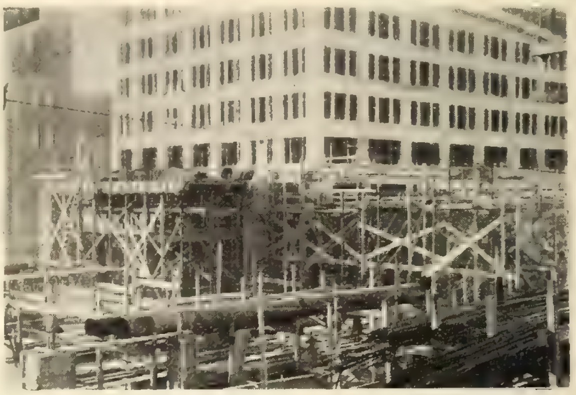
Amalgamated Contracting Interests at Calgary

IN our issue of February 12th, which we devoted largely to the constructional development of the city of Calgary, we gave some particulars concerning the organization and work of the amalgamated interests of Fyshe, Martin & Company, Limited, and of McNeil & Trainer, Limited. This firm now has contracts aggregating over $2,000,000. In the previous article mention was made of a number of the more important contracts completed recently and detailed descriptions were given of the Canada Life Building at Calgary, and the Lougheed Building. Owing to pressure of space we were unable to publish in our Calgary number the following illustrated notes on the Herald Building and other work:

Herald Building, Calgary

Next the Lougheed building, and diagonally opposite the Hudson's Bay Company's new store, the Herald Publishing Company, Limited, of Calgary, have under way the erection of a ten-storey reinforced concrete office building. The building will have an entrance frontage on First street west of 100 feet, and will be 90 feet deep. At first it is intended to build only the corner of the rectangle, forming an L-shaped structure which, later, will be enlarged to enclose the four sides. The building will be 120 feet high above the pavement to the front parapet, and in addition will have a three-storey pent-house, 24 feet higher, which will be in the nature of an observation tower. The street exteriors will be of tapestry face brick with terra cotta trimmings; buttressed pilasters of ornamental terra cotta will give an effect suggestive of the English Gothic style. There will be two main entrances on the ground floor, which will be devoted to one large shop. In the basement will be the printing offices and boilers, with a shop to accommodate the presses required for the publication of the newspaper, there is a mezzannine floor five feet above the ground floor. It is arranged that this floor may be removed at a later date should the increase in values demand the removal of the printing presses. To this end, the floor will be a laminated wooden floor carried on steel beams. On the concrete columns there are brackets cast for the beams to carry the floor at the same level with the present main floor. On the first floor will be the editorial rooms and other offices. The composition and sterotyping rooms will be on the second floor above the ground. The remaining floors will be devoted to office suites for rental purposes. Except as noted above, the construction throughout will be of reinforced concrete. The Corrugated Bar Company, of St. Louis, are the consulting engineers and are supplying the steel for reinforcing. The partitions throughout will be of 4-inch terra cotta blocks, plastered. The exterior walls are to be backed with hollow common brick, and all light walls will be faced with pressed brick.

Proposed Herald building, Calgary


A section of the Herald building, Calgary, under construction

The progress view will give a definite idea of the methods of construction. A hoist-tower is being built in the interior of the building at the elevator shaft and the basement will be used for the storing of all materials. Screened gravel is used for the aggregate. The long tubes are the sheet iron forms used for the columns in the basement. In the rear will be seen the new building for the Hudson's Bay Company, Limited. The architects are Messrs Brown & Vallance, of Montreal. The cost is estimated at $400,000 complete.

Six-Storey Building of the Mushroom Type

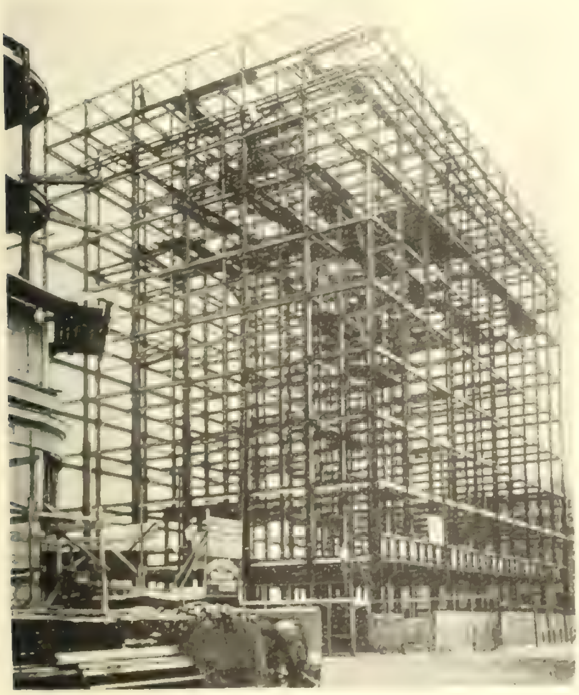
Across the street from the Herald block the foundations are being placed for the six-storey salesrooms for the Calgary Furniture Stores, Limited. This is a reinforced concrete building of the Turner Mushroom type. The building will be 100 feet by 130 feet, with an exterior of tapestry brick and ornamental terra cotta. The interior will be ornamented with iron grilles and will be used for the owner's display rooms. The top floor will be fitted up for a luncheon and tea room. The architects are Messrs. Brown & Vallance, of Montreal.

The same contractors (Fyshe, McNeil & Company) have under construction two other warehouses designed according to the Turner system of reinforced concrete: one for the Calgary Paint & Glass Company, Limited, six storeys high 50 feet by 130 feet, with a brick exterior, costing $75,000, and another for the Northern Electric & Manufacturing Company, Limited, to cost $85,000. This latter building will have an entrance frontage of 50 feet, and will be 130 feet deep, abutting the C.P.R. siding. It will be four storeys in height. The exterior will have red face brick panels between four foot concrete panels formed by the columns of the structure. All exterior concrete faces will be bush-hammered and chiselled. The exterior walls will be 4-inch face brick backed with 8-inch terra cotta blocks. There are to be two stairways and one elevator. All of these are separately enclosed—which, with the hollow metal windows and doors, fireproof partitions, and concrete construction, makes the building fireproof throughout. The architect is

Mr. W. J. Carmichail, of Montreal. Mr. C. S. Morsen, of Montreal, is the consulting engineer.

The Lancaster Building

The Dominion Bridge Company, Limited, have completed the erection of 730 tons of structural steel for the new Lancaster Block at the corner of Eighth Avenue and Second street west. Tenders have been called for the completion of this building and work will commence at an early date. The building will be nine storeys high, being 80 feet wide by 130 feet deep, and will be 116 feet high above the pavement. The exterior will be of gray pressed brick above the second floor, with ornamental terra cotta on the first two floors and for the cornices and details of the exterior. All exterior walls will be backed by hollow common brick. There will be stores on the ground floor, and all other floors will be entirely for office suites. The trim throughout will be red oak; floors will be of maple; partitions are all to be terra cotta blocks, plastered. The structural steel will be fireproofed with terra cotta and concrete, and all floors will be laid on concrete slabs. The exposed walls and lightwells will have hollow metal windows, wire glazed. Three elevators will serve the building. The estimated cost is $450,000. The owner is Mr. J. S. Mackie, of Calgary, and the architect is Mr. Jas. C. Teague, of Seattle and Calgary.



Steel skeleton of Lancaster building, Calgary

Municipal Plans Commission Suggested at Vancouver

At a recent meeting of the Central Ratepayers' Executive, Vancouver, Mr. F. Pardoe Wilson, Secretary-treasurer of the Vancouver Branch of the Canadian Society of Civil Engineers, put forth a proposal for the formation of a Municipal Plans Commission. This body would have authority to thoroughly investigate all proposed municipal undertakings. Mr. Wilson intends to explain the plan to various civic organizations in Vancouver, eventually hoping to have it adopted by the electorate. The plan is outlined as follows:

"The need of such a commission has been emphasized already in the harbor and sewerage question. The city should begin to look to the future so that we may proceed along pre-determined lines rather than in the haphazard manner prevalent, as requirements demand and necessity arises. The commission would be formed from representatives of various civic organizations. Then committees would be appointed to deal with various civic problems. The first to confront them, I suggest, would be (1) transportation, railways, street and inter-urban railways, and highways; (2) waterfront development—this committee to advise with the Harbor Commission; (3) public buildings; (4) city planning; (5) executive, etc., etc.

"The Commission's duty would be to secure plans for city arrangement, with a view of future expansion. Demands for improvements would be considered from the standpoint of city expansion, improvements and changes in public utilities, lines of transportation and widths and grades of arterial highways.

"The first step would be appointing a committee of experienced engineers. The commission would meet, consider these engineers' submitted plans, and put them in shape for presentation to the council. After this, a plebiscite would be taken, and if approved by a two-thirds majority, would be adopted.

"Such a systematic procedure would affect an enormous saving, and need only be brought before the public to be recognized. I sympathize with the city engineer, and know this plan would relieve him of a mass of work.

"There should be internal communication by street cars and arterial highways, the selection of which now seems governed by real estate and private interests. On this, the commission would investigate and report. A great opportunity has been missed in the Georgia-Harris street viaduct. With the coming of the Great Northern and Canadian Northern, this bridge, to best serve the city, should come down Prior street and have a branch either to Columbia or Manitoba streets. It would be the duty of the commission to prevent such glaring mistakes as this by planning routes to give the best facilities."

From the Federal Capital

Correspondence of the Contract Record

Ottawa, February [illegible], 1913.

THE City Building Inspector recently issued his annual report on the buildings during 1912. The total number of permits issued during 1912 was 627, aggregating $3,621,850, while for 1911 the figures were 657 and $2,997,610 respectively.

Allocating the buildings according to the various kinds of materials of which they were constructed, the Building Inspector reports as follows: Solid brick, stone or concrete, $1,965,675; brick veneer, $1,475,500; ironclad, $101,000; wood or frame, $79,675; total estimated cost, $3,621,850.

The number of permits and the estimated cost of buildings erected in Ottawa during the past four years are as follows: 1909, 658 permits, [illegible]; 1910, [illegible] permits, $3,022,650; 1911, 657 permits, $2,997,610; 1912, 627 permits, $3,621,850.

In the year 1909 permits were issued for the Chateau Laurier and the Central Station, making the cost somewhat abnormal that year.

Civic Incinerator

The incinerator built for the city has not been taken off the contractors' hands yet, notwithstanding the fact that another two tests have been made. After the first test, made about three weeks ago, the contractor installed a coke grate directly under the boiler to get steam up more quickly. Formerly it was necessary to back fire for about three hours [illegible] to get enough steam to hoist the skips. This means practically no material burned and the shift of men doing practically nothing for three hours. During the test last week, the chain running the fan for the draught broke and [illegible] the piston rod, thus stopping the completion of the test. For the first day of the test the incinerator destroyed seventy-nine tons of refuse, being four tons in excess of the amount called for in the specifications. The city will not take the plant over until another test has been made, and then only if it lives up to specification. The contractors will be given their own time to make the test.

Hopewell Smallpox Hospital

This building, which is now completed, is erected on Porter's Island, an isolated municipal property, and, as designed, equipped and in situation, is one of the finest examples of a hospital building on the continent. The design from an architectural standpoint is decidedly well handled, being Italian in character. The basement or ground floor contains the administration and living quarters, laundry, sterilizing rooms, heating apparatus, morgue, and discharge rooms. The upper portion of the building is divided into four wards, with a capacity of thirty patients each, nurses, observation rooms, diet kitchens, dispensary and solariums. The building is comparatively fireproof in construction. The walls are of local brick, and the floors reinforced concrete, with Terrazo finish. The plumbing is of a modern character and the ventilation is electrically operated.

Hopewell Smallpox Hospital, Ottawa

The hospital was designed by Mr. Frank C. Sullivan, of Ottawa. Mr. Geo. Crain was the builder.

Bronson Avenue Viaduct

The above viaduct, of which two diagrams are reproduced herewith, will be constructed over the Grand Trunk Railway tracks on Bronson avenue. The one diagram shows an elevation of the viaduct and the other a general section. The structure over all will be 910 feet in length, 31 feet from rail to top of railing, with 23 feet clearance, and the columns will be placed 30 feet apart. The width of the viaduct will be 51 feet—40 feet for street and 11 feet for sidewalks. The grade on both sides is 5 per cent. The structure is designed for heavy highway traffic, provision being made for an electric railway to cross it, with a double track. The city bears the cost of the concrete retaining walls, earth filling and flooring, and the G. T. R. will erect the steel bents and stringers. The plans for the viaduct were prepared by the City Engineer's Department.

Water Purification

Sir Alexander Binnie and Dr. A. C. Houston are working at present in Ottawa on the proposed water supply for Ottawa. Last week they visited the McGregor Lake district and the other lakes further into Quebec, going as far as thirty miles from the city. A report is expected from them this week. Application will be made to the provincial authorities for permission to issue the necessary debentures, without a vote of the people, to install whatever plant for water purification may be recommended by Sir Alexander and Dr. Houston. Sir Alexander Binnie is the noted British engineer, and Dr. A. C. Houston has a world-wide reputation as a bacteriologist.

The water rates this year have been increased by twenty per cent. to help reduce last year's huge deficit.

Municipal Electric Plant

The legislature will be asked to give the city permission to issue debentures to the amount of $150,000, so that the plant can be changed into 3-phase instead of a 2-phase. The amount includes the building and equipment of a 3-storey reinforced concrete storehouse on Slater street at a cost of $16,000.

Beautification of Parliament Hill

The government is having prepared a comprehensive scheme for the improvement of Parliament Hill. Mr. Noulan Cauchon, of Ottawa, has been asked to prepare and outline an artistic scheme that will embrace not only the beautification of the Hill, but also the improvement, from a scenic viewpoint, of the banks of the river, from the Rideau Canal locks down to Kent and Lyon streets. The Hon. Geo. H. Perley has the whole matter under consideration.

Government Estimates

The allowance for Ottawa in the estimates is fairly large. The most important items in the estimates are as follows: New Departmental Buildings, $2,000,000; additions to Eastern Departmental Block, $100,000; additional buildings for Astronomical Observatory, $75,000; additions and improvements to Parliament Buildings, $100,000; Customs Building, Sussex street, $250,000; drill hall, $50,000.

For Bank street bridge there is an allowance of $40,000.

Mr. Edward White's proposal for the new departmental block on Wellington street is at present being considered by the Ministers, and they hope to report upon the proposal shortly. Work should be commenced upon the buildings in the early summer. Two million dollars have been placed in the estimates for commencing this structure. The total cost will be in the neighborhood of six million dollars.

Ottawa Improvement Commission

The above Commission have a large amount of construction in prospect this year. The new members elected this year are Mr. Denis Murphy, Mr. H. K. Egan and Mr. E. G. Laverdure.

Corporation Scavenging System

The City Council have decided to break away from the team owners' demands for increases by adopting the Board of Control's recommendation to raise $30,000 by debentures for the purchase of horses, carts and equipment, and also motor trucks, for the use of the Corporation. The city can keep twenty-five to thirty horses steadily employed.

King Edward VII. Monument

The above monument will be erected on the Parliament Hill between Wellington street and the East Block, overlooking Confederation Square and the Rideau Canal. The estimated cost is $40,000.

The bill now before the Dominion Parliament asking for an increase of five million dollars capitalization of the Richelieu and Ontario Navigation Company, has passed its second reading. Sir Rodolphe Forget, President of the company, informed Parliament that it was proposed to spend half a million dollars on vessel terminals at Fort William.

Enthusiastic Forecasts from St. John, N.B.

Active House-Building Campaign Mooted—Industrial and Constructional Activity Outstripping City's Facilities on Every Side

Correspondence of The Contract Record

St. John, February 14th, 1913.

THE need for a building campaign on a large scale at St. John, N.B., is emphasized by recent developments here. It is practically certain that 1913 will be the greatest constructional year in St. John and the vicinity since the period immediately after the great fire of 1877. The Board of Trade and the real estate men are blamed for the manner in which rents have soared lately, but the fact is that there are not enough houses, and with the augmented population—attributable to the new factories that are starting—an active house building campaign is the only way out of the difficulty.

The Atlantic Sugar Refineries, Limited, will begin work at once on the foundation of the big new factory. Mr. F. H. Anson, managing director of the company, with Mr. Henry Holgate, consulting engineer, Montreal, were in town last week. Mr. L. R. Wilson, treasurer of the company, has removed with his family to the city, and Mr. Edwin J. Jarrett, vice-president of the Foundation Company of New York, is also here. After looking over the site and getting the reports of the men who had been taking borings, it was decided to begin work at once upon the foundation. Mr. Anson said it would probably be necessary to go down twenty-five or thirty feet in some places. Gangs of men will be kept at work on the excavation night and day, and the construction of the whole group of buildings, which with equipment will cost between $2,000,000 and $3,000,000, will be rushed.

The Municipal Council of St. John, city and county, recently turned down a proposition to erect a municipal building on Market Square at a cost of $300,000, and an architect is now at work preparing plans for adding two storeys to the present court-house on King Square, and adding an extension to the building. Elevators will be provided and the preent building remodelled. It is estimated that this will cost about $100,000, and the work will probably be done in order to provide accommodation under one roof for all of the city and county offices.

While the city council and the St. John Railway Company are still negotiating—as they have been for more than a year past—about the terms of an extension of the railway line toward East St. John, the Suburban Railway Company is seeking incorporation, with power to construct tramways in the outlying parishes of Simonds, Rothesay and Lancaster. As yet the St. John Railway Company has not made an extension into the outlying districts. There is great need of such extension, because the city must grow outwards to the east, north and west. As the city grows, many streets in the city proper must be changed from residential to business purposes. There is so keen a demand for new houses that there has been a great increase in rents, so much so in fact that no other subject is so universally discussed at the present time. The population of the city has been growing faster than its housing accommodation. A group of investors who have purchased a property on one of the roads leading out of the city say they are prepared to build twenty-five dwellings or more next [illegible] they are assured that a street car service will be provided. One of the most pressing needs of St. John to-day is street car extension into the suburbs, and the erection of cottages which could be let at a reasonable rental. At a meeting of the local builders' exchange, representatives of three large American construction firms having contracts at St. John were present and declared that from the building standpoint St. John had a very bright future, and there must be continued activity on an increasingly large scale.

Mr. A. M. Bouillon, chief engineer of the eastern division of the Grand Trunk Pacific, had an interview last week with the provincial government with regard to the proposal to connect that line with the St. John Valley Railway at Fredericton, and bring its traffic, which is destined for St. John, over the valley road to this port. There is a new proposal with regard to the St. John section of the valley road. This is that instead of crossing the St. John River below Gagetown the line should be continued down the west bank of the river the whole distance, and enter the city across a bridge at Navy Island at the head of the harbor. This would be made a railway, street car and traffic bridge, and as it would supersede the present ferry service to a large extent, the city could afford to grant a considerable subsidy. The annual receipts from the ferry at present would pay 5 per cent. on a capitalization of $1,000,000.

New Industries in Prospect

St. John is going after new industries. In fact the biggest thing that has happened in the recent history of the city has been the re-creation of the board of trade, and its determination to pursue an aggressive program for the development of the city. In December last, when at the annual meeting a new council of the board was elected, made up chiefly of the younger business men of St. John, the board had a small membership and was in debt $1,400. To-day the membership of the board is approaching eight hundred, each member signing an agreement to pay $25 per year for three years. It is practically certain that this movement, for new members are still coming in, will give the board over eight hundred members and a fund of at least $20,000 a year for three years with which to carry on its programme. The first step will be the engagement of an Industrial Commissioner who has had practical experience in town development. The board will then be divided into strong committees, dealing with various questions relating to the industrial, commercial, civic, educational and social life of the people. The board will be made a central organization for promoting in every line the welfare of the city. Town planning, new industries, more business establishments, more houses, and a general improvement of living conditions, will be important features of the work.

While construction work has continued steadily throughout the winter at East and West St. John, there has been a slightly lessened demand for common labor of late, and the supply at the moment is slightly in excess of the demand. These conditions, however, will very soon change when warmer weather sets in.

It is announced that the Carpenters' Union will ask for an eight-hour day after the 1st of May. The rate for carpenters is $3 for a day of nine hours, and they will endeavor to get the same rate for a day of eight hours. It is said that other unions in the building trades may also ask for improved conditions.

Complimentary Season Tickets for the Clay Products Exhibition, Chicago, Feb. 26 Mar. 8, may be obtained at the office of The Contract Record.

Normal Conditions Prevail at Winnipeg

Nevertheless Prospects Bright for Higher Records in 1913—Progress in Concrete Work a Feature of Current Construction

Correspondence of The Contract Record

Winnipeg, February 11, 1913

AT the capital of Manitoba, building operations are progressing satisfactorily, although there are no exceptional developments to record. Conditions are normal, this being evidenced in part by the fact that the total value of the permits issued last month was practically on even with the corresponding month of last year. The month of January however is hardly a fair criterion to take in making a comparison between one year and another, and so far from being a prophetic utterance, it is a simple and safe assertion that the record of twenty million dollars established in 1912 will be left far behind at the close of 1913. Your correspondent outlines below features of design and construction of some of the more noteworthy building undertakings.

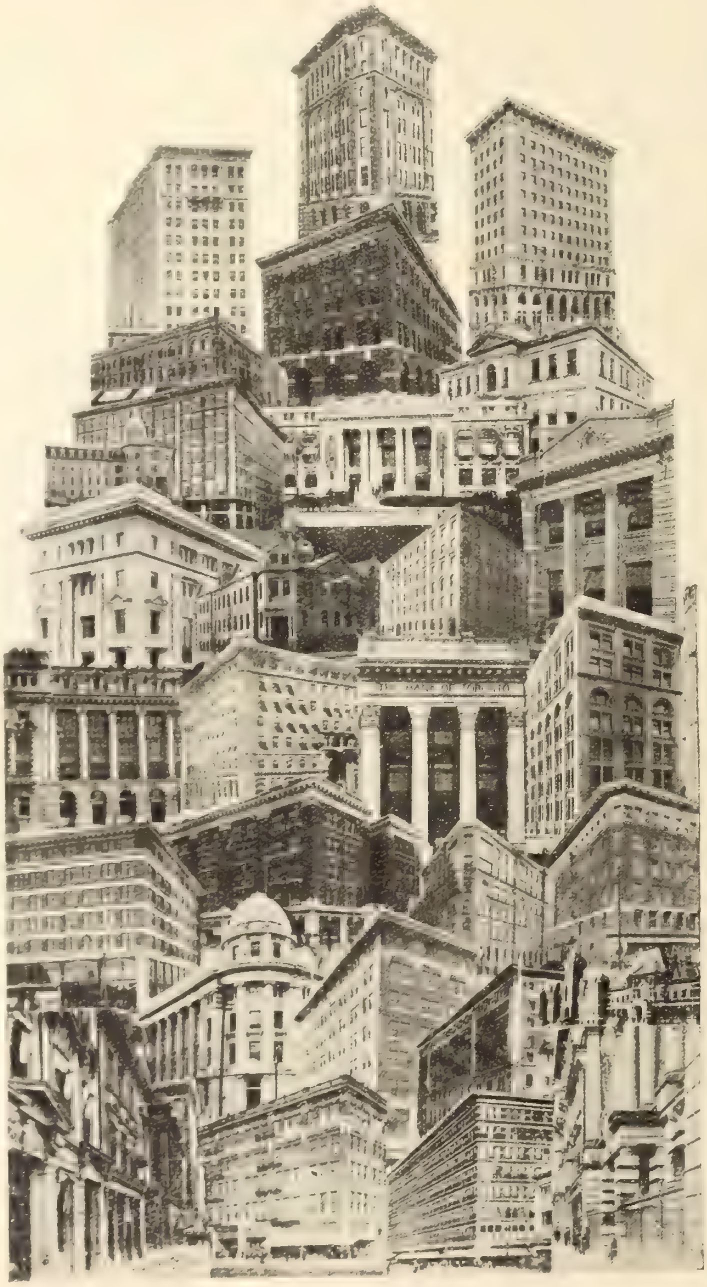
Concrete Construction in Winter

A six-storey warehouse is being built on Charlotte street, just north of Notre Dame avenue. When completed this building will be occupied by Clark Brothers, stationers. The building is entirely fireproof, being of reinforced concrete construction with curtain walls of red brick on the Charlotte street frontage and yellow brick on the sides and rear. This building is an example of how concrete work can be carried on during the severe Manitoba winter. The sides were covered with canvas during construction and sufficient heat was maintained inside the building to keep the temperature well above freezing point. The architects are Woodman & Cary and John Gunn & Sons, the general contractors.

The Strand Theatre is situated on the east side of Main street, just south of Rupert. Work on this building was commenced in November, so that it, also, was built entirely in the winter weather. The building is of brick and steel construction.

Another structure worthy of mention is the 4-storey store and office building now being erected for the Notre Dame Investment Company on Cumberland avenue. The building is triangular, with a frontage on Cumberland avenue of 160 ft. The depth at the lane to the west of the building is 113 ft., the third side being 120 ft. The west and south corners are rounded on a 5 ft. radius, and the east corner is cut off giving the building a frontage of 8 ft. on Hargrave street. There are four storeys and a 10 ft. basement, the first storey having 13 ft. clear from top of floor to bottom of ceiling, and the remaining three storeys, 11 ft. The floors are carried by 9 in. cast iron columns, the main stringer being a 16 in. by 18 in. wooden beam. The floors are hardwood finish on top of 2 in. by 6 in. timbers, laid on edge. The stairs are oak and the ceilings are ornamental sheet metal. The walls over the store fronts are carried by a 15 in. by 80 lb. I-beam. The exterior walls are of red pressed brick. The roof is tar and gravel. The ground floor is divided into stores and the remainder of the building into offices and travellers' sample rooms. Mr. C. U. V. Chivers is the architect, and The J. McDiarmid Company are the general contractors.

On the north-east corner of Sherbrooke street and Ellice avenue there is now being erected a building with a frontage of 99 ft. 7 in. on the former, and 51 ft. 7 in. on the latter street. The ground floor contains two stores, each 18 ft. wide, and a picture theatre, 31 ft. wide, running the full length of the building. The theatre will seat 300 persons and is finished with ornamental plastering. The second floor is divided into seven offices. The floors and the walls above the main doors and store fronts are carried by steel I-beams. Mr. J. D. Atchison



A group of Winnipeg buildings, showing the type of business blocks that have been erected during the last few years by the large financial and commercial firms. Collective evidence of the faith in Winnipeg's future.

is the architect, and Mr. N. T. MacMillan the owner and contractor.

Cheaper Delivery of Crushed Stone

Crushed stone and gravel, of which the city uses many thousands of tons yearly in street work, could be delivered in Winnipeg at half of the present cost, according to Quarry Superintendent Kelpin, who has charge of the big stone quarry at Stony Mountain and the gravel pits at Bird's Hill. All that is necessary to accomplish this is the building of electric tramways to the city and the reaching of an agreement with the Winnipeg Electric whereby the material could be carried over the city lines to the spot where the material is required for use. Mr. Kelpin has put his project before the Board of Control more than once, as he looks upon the present system of delivery as a needless waste of money. "If we had the transportation facilities that could be worked out this way, Winnipeg would get stone and gravel for its street work of all kinds cheaper than any city on the American continent," says Mr. Kelpin.

Controller Cockburn favors the idea and would even extend it so as to benefit the surrounding municipalities which will in the next seven years use enormous quantities of stone and gravel. He believes that the municipalities should secure gravel pits adjoining the city pits at Bird's Hill, and have the whole lot operated by electricity supplied by the city, which will be operating its own pit by electricity this year. Then it would be well worth while for the city to build a tramway and carry the material into the city or to the nearest point where it would be available to the different municipalities. With running rights over the city street car lines, the "dump" cars could be run right into Kildonan on either side of the river, into Assiniboia, St. Boniface and to the borders of Fort Garry and St. Vital. In due time there will be car lines into the latter municipalities, which would still further enhance the possibilities of the scheme.

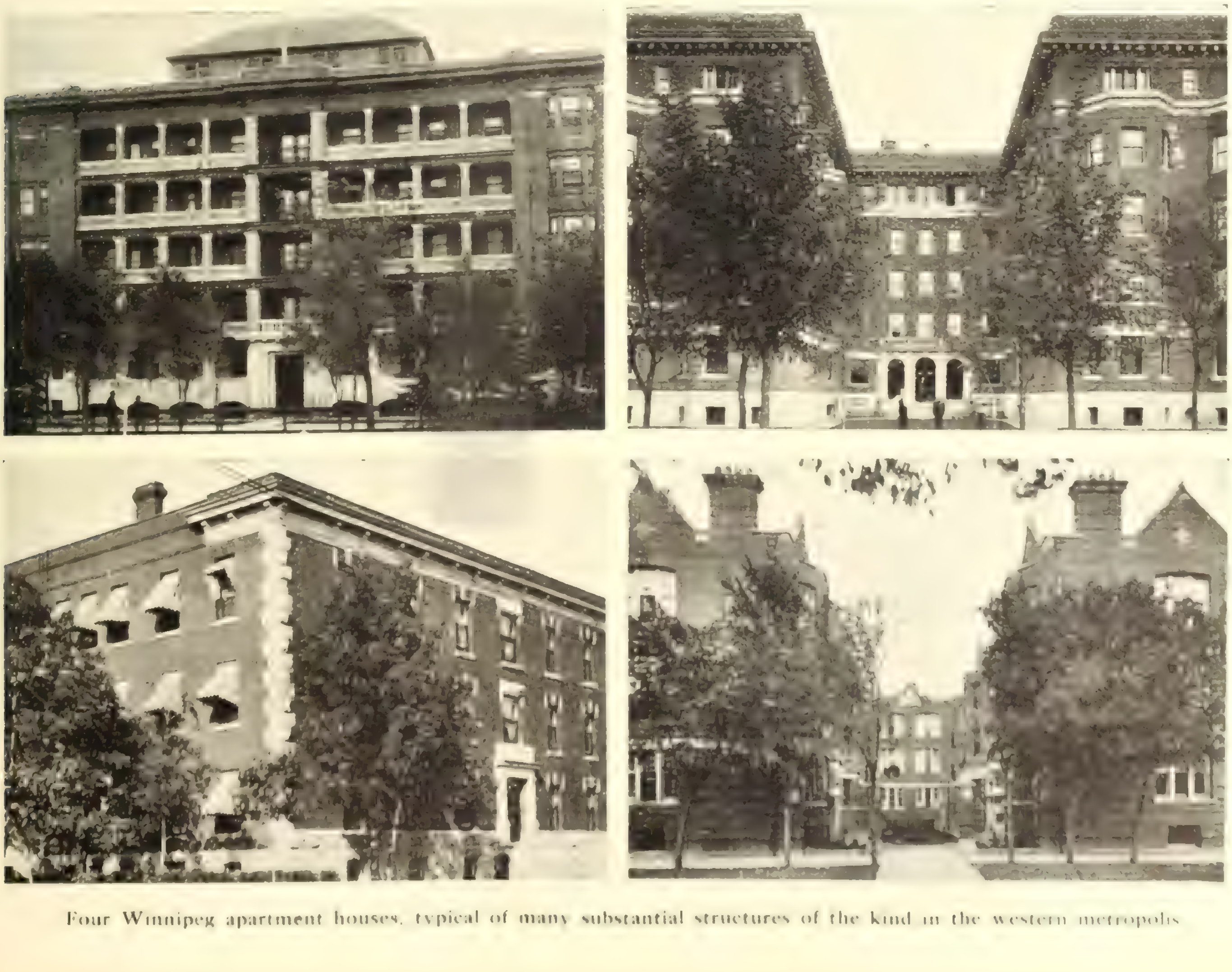
Encouragement for Good Roads Project

Gratifying encouragement was given by Mayor Deacon at the meeting of the Good Roads Committee of the City Council last week. Mr. Deacon said:

"I am of the opinion that your committee is a very important one and that it would well repay this city to have a conference with the officers of the municipalities immediately surrounding Winnipeg and see if some definite plan could not be formulated for the construction of good roads radiating from this city, each municipality of course, bearing its just proportion of the cost.

"Premier Roblin told me that he was prepared to assist liberally in this work. These roads could be constructed on long term debentures and I feel confident that the farmers whose lands abutt or were tributary to the roads, could easily be shown that it was good business on their part to have roads constructed and to pay their annual share of the cost."

A deputation headed by W. H. Bennett, M.P., and Senator Owens waited on the Government recently to ask for a Federal subsidy for the proposed Central Canada Railway from Montreal to Midland, with a branch line from Montreal to Ste. Rosalie, giving connection through to the seaboard. Premier Borden promised sympathetic consideration of the request, and it is probable the railway subsidies to be brought down at the end of the session will contain a vote for the Central Canada Railway.



Four Winnipeg apartment houses, typical of many substantial structures of the kind in the western metropolis

Many Important Projects at Vancouver

Local Firm Secure Record Contract—Interesting Features of Design and Construction in the Proposed Y. M. C. A. Building

Office of the Contract Record,
Vancouver, B.C., Feb. 12, 1913.

BUILDING and engineering construction at Vancouver were almost at a standstill in January, owing to the heavy snowstorm which swept over the lower mainland of British Columbia during the early part of the month. The recent inclement weather was largely to blame for the comparatively small number of permits issued; however, with the more favorable weather conditions of February there is much greater activity in all classes of building construction. At the present time labor, both skilled and un-skilled, is plentiful at the coast, as far as the building trades are concerned, and contractors do not anticipate any shortage in the supply for the early part of the season.

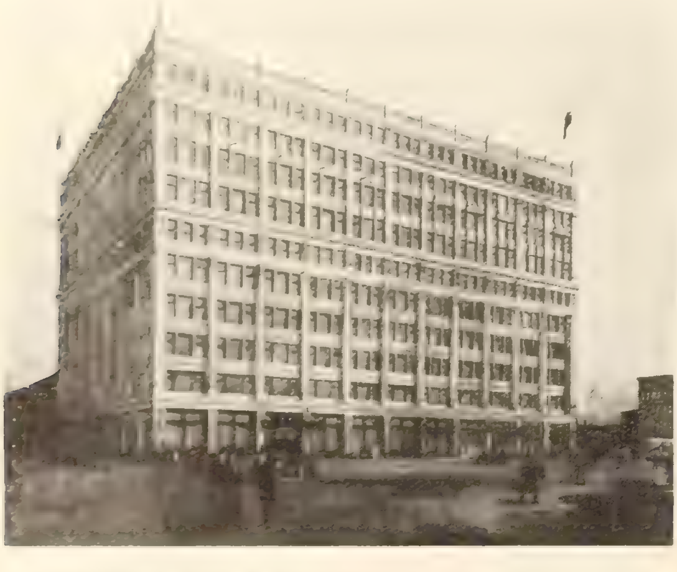
The building supplies market is experiencing the period of inactivity which usually precedes the commencement of the season's building operations. A large number of contracts will be commenced during the next few weeks, and the demand for all classes of building material is, therefore, bound to become a great deal more active.

In commercial circles, money is reported rather tight. Collections have been slow for some time past, and the indications are that this stringency will continue for some weeks at least. Despite this, a remarkable amount of building construction is projected for February, the most important contract of all being the new Hudson's Bay store, which will cost upwards of $2,500,000. Preliminary construction work will also be commenced on the new Y. M. C. A. building, the new Vancouver Club, the Yorkshire Guarantee & Securities Corporation office block, and many other important contracts.

EXTENSIVE BUILDING OPERATIONS IN FEBRUARY

Contract for Hudson's Bay Building Awarded

The contract has just been let for the new addition to the Hudson's Bay store on the corner of Seymour and Georgia streets. The local firm of Messrs. Rourke, McDonald & Moncreiff are the successful tenderers. The excavation for the new block will be commenced immediately and several shifts will be employed in order to have the building completed for next Christmas trade. The foundation work, in itself, will be a big task, as the depth of the excavation will be forty feet, in order to provide two basement floors. That portion now under contract will have a frontage of 140 feet on Georgia street, and 175 feet on Seymour street. As soon as completed, the present business will be transferred and the old building demolished, including the adjoining Turner Building on Granville street, also owned by the company. A duplicate of the new premises will be immediately erected on the Granville-Georgia corner.



Proposed Hudson's Bay Store, Vancouver.

The new store building will be ten storeys in height, of steel and reinforced concrete construction throughout, and absolutely fireproof. The exterior will be faced with Carrara terra cotta, and between each section of windows there will be Corinthian columns as shown in the illustration reproduced herewith. All elevators and staircases will be enclosed with fireproof partitions. The store will possess its own heating, lighting and refrigerating plants, and even artesian wells. A thorough system of ventilation will be provided. The fresh air will be drawn from the outside, passed through a filter and purified, then circulated throughout the various selling floors. The mechanical plant and operating equipment has been designed by Mr. Percival R. Ross, E.E., of New York, who has been identified with the internal construction of some of the best known departmental store buildings in America. The fittings and fixtures are being designed by Messrs. Taussig & Fleisch, of Chicago, and it is anticipated that the interior arrangements of the selling sections will be on a most elaborate scale.

The outlay involved in the construction of this building is estimated at approximately $2,500,000, the largest sum ever expended in the erection of a building in Vancouver. Messrs. Burke, Horwood & White, the well-known store architects, of Toronto, designed the structure.

Work Started on New Hotel Vancouver

The work of demolishing the old centre portion of the Hotel Vancouver on Georgia street is well advanced, and no time will be lost in pushing this work to completion. After taking down the old structure, the contractors will immediately commence excavating for the foundation of the new hotel, which will be of reinforced concrete construction containing about 250 rooms. It is not expected that actual construction work will commence before spring, the interim being given over to the making of foundations. Messrs. Skene & Christie, Vancouver, are the general contractors.

The Dominion Supply Company were recently awarded the contract for the erection of the new ten-storey office building for the Yorkshire Guarantee & Securities Corporation, Limited, on Seymour street, Vancouver. It is expected that preliminary preparations in connection with this important building project will be completed by the third week in February, and the actual construction started before the end of the month. This building will measure 50 x 120 feet, and will be of reinforced concrete construction, with pressed brick and terra cotta facings on the front elevation. The ground floor will be fitted up for banking, trust and brokerage purposes, and will be occupied by the Yorkshire Guarantee & Securities Corporation, Limited. The succeeding nine storeys will be elaborately finished in high grade materials. Heating, lighting and ventilation systems will be thoroughly up-to-date. Messrs. Somervel & Putnam are the architects.

B. C. E. R. Company's Plans for Victoria

The directors of the British Columbia Electric Railway Company have purchased a large section of property at the corner of Douglas street and Pandora avenue, Victoria, to be utilized as a site for a large office and terminal building. The frontage on Douglas street is 54.7 feet, on Pandora avenue 161.6 feet, and 60 feet on Cormorant street. Plans are now under consideration for a ten storey structure, which the company will erect on this site at an early date. The first four or five storeys will be reserved for the various offices of the company, as well as to provide terminal stations for the suburban system.

The cars will reach the building from Douglas street via Cormorant street on three tracks running through the terminal station, each track capable of holding trains of three cars each, to Pandora avenue, down that thoroughfare to Douglas and so out to Saanich. The remaining storeys of the building will be equipped as offices for public rental, and taken over as the company's business expands.

New Church at Second Avenue

The congregation of the Kitsilano Methodist Church is planning to erect a new church and Sunday school building, at the corner of second avenue and Larch street, Vancouver. Tenders are now being called for the construction of the school room, and building operations are expected to commence at an early date. The cost will be approximately $30,000. The immediate completion of the main part of the edifice is not at present contemplated. The architectural style of this new church is classic, based on Greek Doric. It will measure 106 x 74 feet and will be of reinforced concrete construction throughout. Six large columns will be erected at the main entrance, with three doors as entrances. The main entrance will be 50 feet in width and the main auditorium will have seating capacity for 750 persons, the gallery accommodating an additional 380. The choir loft is to be 32 feet wide by 18 feet in depth, while the rostrum is to be 40 feet wide and 18 feet deep. Seats will be arranged in the semi-circular manner. The cantilever system will be used in the construction of the gallery, extending round three sides of the interior in the form of a horseshoe. A dome of glazed stained glass, 35 feet in diameter, placed in the centre of the church, will supply light to the main portion of the interior. The artificial lighting system will consist of concealed electric lights. The interior finish is to be B. C. fir.

The cost of this building is placed at approximately $90,000. Mr. Thomas Hooper prepared the plans.

Other Notable Work

Mr. E. J. Ryan, contractor for the Canada Hotel, now in course of construction on Richards street, Vancouver, recently awarded sub-contracts for this seven-storey building, covering stone, brickwork, heating and plumbing, lumber, roofing, sheet metal, cornice, and electric wiring. Frank L. Dixon was awarded the brickwork; Timms & Phillips, lumber; plumbing and heating, Barr & Anderson; roofing, sheet metal and cornice, Western Sheet Metal Works; electric wiring, Electrical Construction Company; stone, Monarch Art Stone Company, Limited.

Work will commence immediately on a six-storey mill construction apartment building to be erected on Georgia street, between Jervis and Broughton streets, Vancouver. The building will measure 66 x 132 feet. Pressed brick, trimmed with terra cotta, will be used for the exterior facing. The building will contain fifty-six 2 and 3-room apartments. These will be furnished with hot and cold water built-in buffets, writing desks and other conveniences. They will be finished with beamed ceilings and fir panels. The entrance hall will be decorated in marble and tile. The cost of the entire structure is estimated at approximately $100,000. Mr. Emil Guenther is the architect.

Work has just commenced on a four-storey, steel and brick addition to the premises of the Canadian Brewing Company, on Yew street, Vancouver. This building will occupy a space 50 x 205 feet and will be erected at a total cost of $70,000. The ground floor and first floor will contain 38 fermenting tanks. The two upper storeys will be given over to large vats. These will be placed in the front portion of the building. The four floors in the rear will be used as a bottling, packing and washing plant. Mr. James Kelly is the architect and contractor for the new building.

Plans are in course of preparation for a five-storey brick and mill construction warehouse, to be erected at 1004 Albert street, Vancouver, for Mr. H. S. Rowling, of Rowling & Phillips, Hastings street. The building will cost approximately $50,000, and will be used for stores and rooms. No further details are available at present writing.

Work is about to commence on a two-storey mill construction apartment house at the corner of Sixth avenue and Alberta street, Vancouver, for Mr. W. G. Elliot. The building will be 64 feet square, faced with pressed brick and trimmed with stone, the colonial style of architecture being followed in the design. The entrance hall will be decorated in marble and tile. Fir is to be used for interior panelling and other woodwork. There will be twelve three-room suites in this building, equipped with modern conveniences. Hot water will be employed for heating purposes. Mr. J. Y. McCarter is the architect, and the Dominion Construction Supply Company will have charge of the contract. The cost is $30,000.

Work will commence at an early date on a three-storey warehouse to be erected for Gray Bros. at the foot of Davie street, on the C. P. R. reserve, Vancouver. The structure will occupy a space 50 x 120 feet, and will be of pier construction, having solid brick piers erected at intervals, with curtain walls of brick between them. The ground floor will contain a large office, the upper storeys being entirely devoted to storage space. The office will be finished in fir. An electric freight elevator will be installed. The cost of the building will be approximately $35,000.

Three mill construction buildings, each three storeys in height and having a total frontage of 298 feet, were completed during January for the Chinese Reform Association on Alberta street, Vancouver. Pressed brick and imitation stone were used for exterior facings. Fir was employed as inside finish. Fifteen stores are contained on the ground floor space, and there are 250 rooms in the upper storeys. The total cost of the three buildings was $100,000. Messrs. Stuart & White, associated with Messrs. F. & J. Peters, were the architects. Mr. L. B. Wood had charge of the construction.

A two-storey mill construction apartment house will shortly be erected at the corner of Alberta street and Sixth avenue, Vancouver, for Mr. W. G. Elliot. There will be twelve suites of two and three rooms each in the building. The entrance will be treated in marble and terrazzo tile, with pressed brick fronts. The interior finish will be B. C. fir. Hot water will be employed for heating purposes. The cost is placed at $30,000.

A two-storey store and office building will shortly be erected on Granville street, between Robson and Smythe streets, Vancouver, at a cost of [illegible]. The [illegible] will be of Clayburn pressed brick and the remaining three walls of hollow tile block. The ground floor will be occupied by two stores and the upper storey will contain offices. The [illegible] of the stores will be [illegible] will be [illegible] The inside finish of the offices is [illegible]. A hot water system of heating is to be employed. Excavation work on the foundation is now completed, and work will be started on the superstructure. Mr. J. W. Keagly is the architect.

Plans have been completed for a 4-storey store and rooming house building to be erected on Union street, between Dunlevy and Jackson streets, Vancouver. The dimensions of the structure will be 50 x 50 feet. The front elevation is to be of Clayburn pressed brick, decorated with stone. The party walls will be of ordinary brick. The main entrance will be finished in marble and tile. Interior woodwork finish is B. C. fir. All bathroom walls will be of colored tile. The ground floor will be occupied by two stores, and the three upper storeys will contain 45 rooms. Steam heating will be employed. The cost is estimated at approximately $24,000. Mr. N. E. Symonds is the architect.

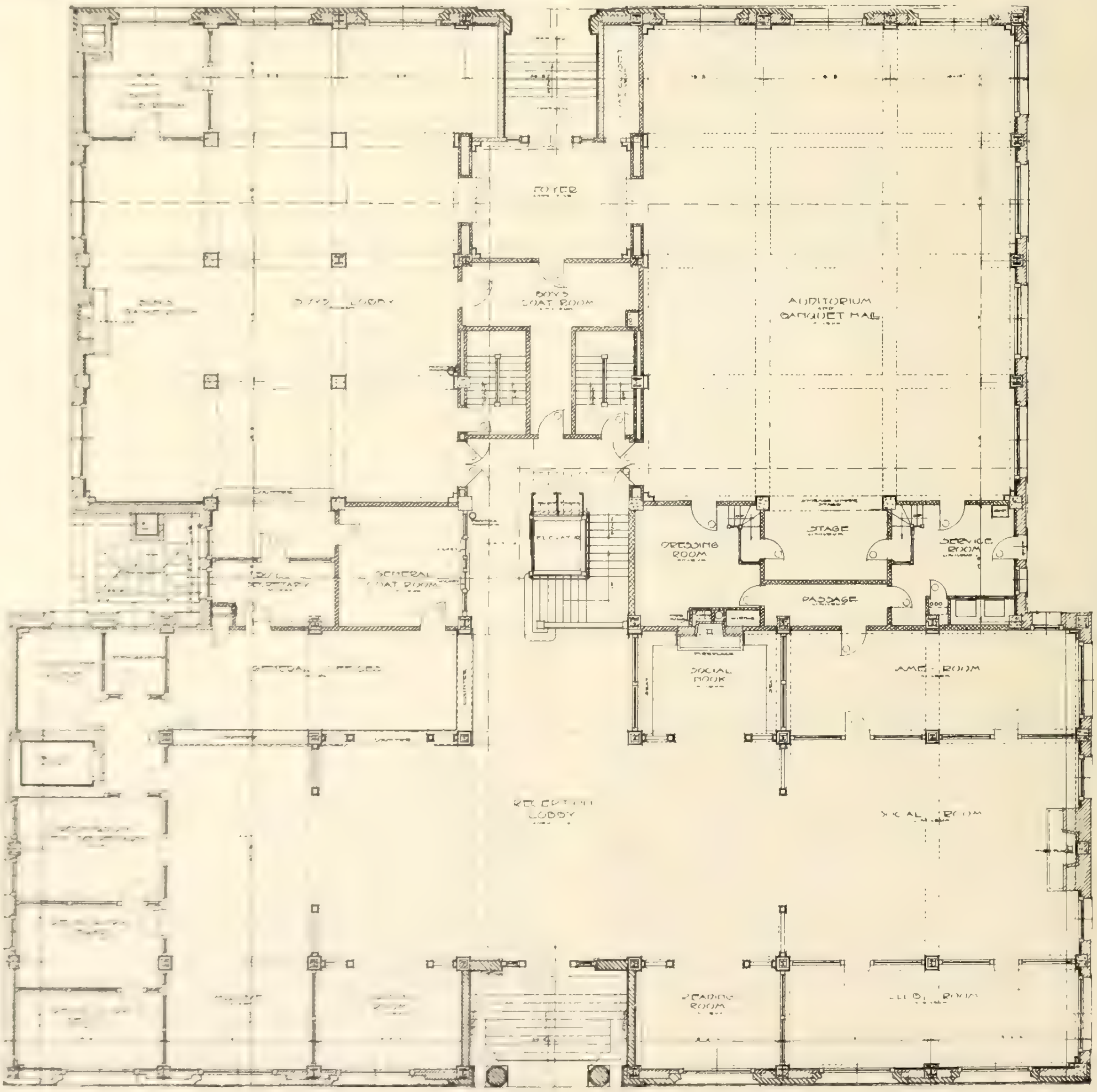
Messrs. Honeyman & Curtis, architects, Vancouver, were recently instructed to prepare plans for a four-storey building to be erected by the Canadian General Electric Company, adjacent to their headquarters, at 1065 Pender street west, Vancouver. The new building will be the exact size of the present structure, measuring 32 x 132 feet, and will be used for warehouse purposes and for the offices of associated interests of the C. G. E. The cost of the new building has not yet been announced.

Important Contracts Awarded

The Granby Consolidated Mining & Smelting Company is making preparations for an active year at Granby Bay, Portland Canal district, B.C. The company recently let contracts for the material that will be used in erecting the great smelter during the coming summer season. The contracts awarded run into a sum exceeding $1,300,000. These contracts are for machinery for the plant, and for structural steel to be used in the erecting of the works that are to handle the ore output, from the Hidden Creek mines at Observatory Inlet, which will be one of the industries that will be tributary to Prince Rupert.

The Canadian Westinghouse Company and the Canadian Northwest Steel Company of Vancouver were among the successful tenderers. The work that the company has undertaken there will build up an immense mining and smelting centre in the district. The outlet for material will be by way of Prince Rupert, while Vancouver will be the base of supplies for the thriving city that will be established in consequence of this industrial activity.

The Burnaby Municipal Council recently awarded the



First Floor Plan, Vancouver Y. M, C. A. Building.

contract for the paving of Kingsway to the Canadian Mineral Rubber Company, Limited, Vancouver, who will perform the entire work at the price of $334,000. The company put up a bond of ten per cent. of the contract price as a guarantee of maintenance for ten years. The company is to commence work immediately after the passage of the estimates, subject to the government grant. The government has promised half the amount of the contract price, on condition that the class of material to be used should meet with the approval of Hon. Thomas Taylor, Minister of Public Works.

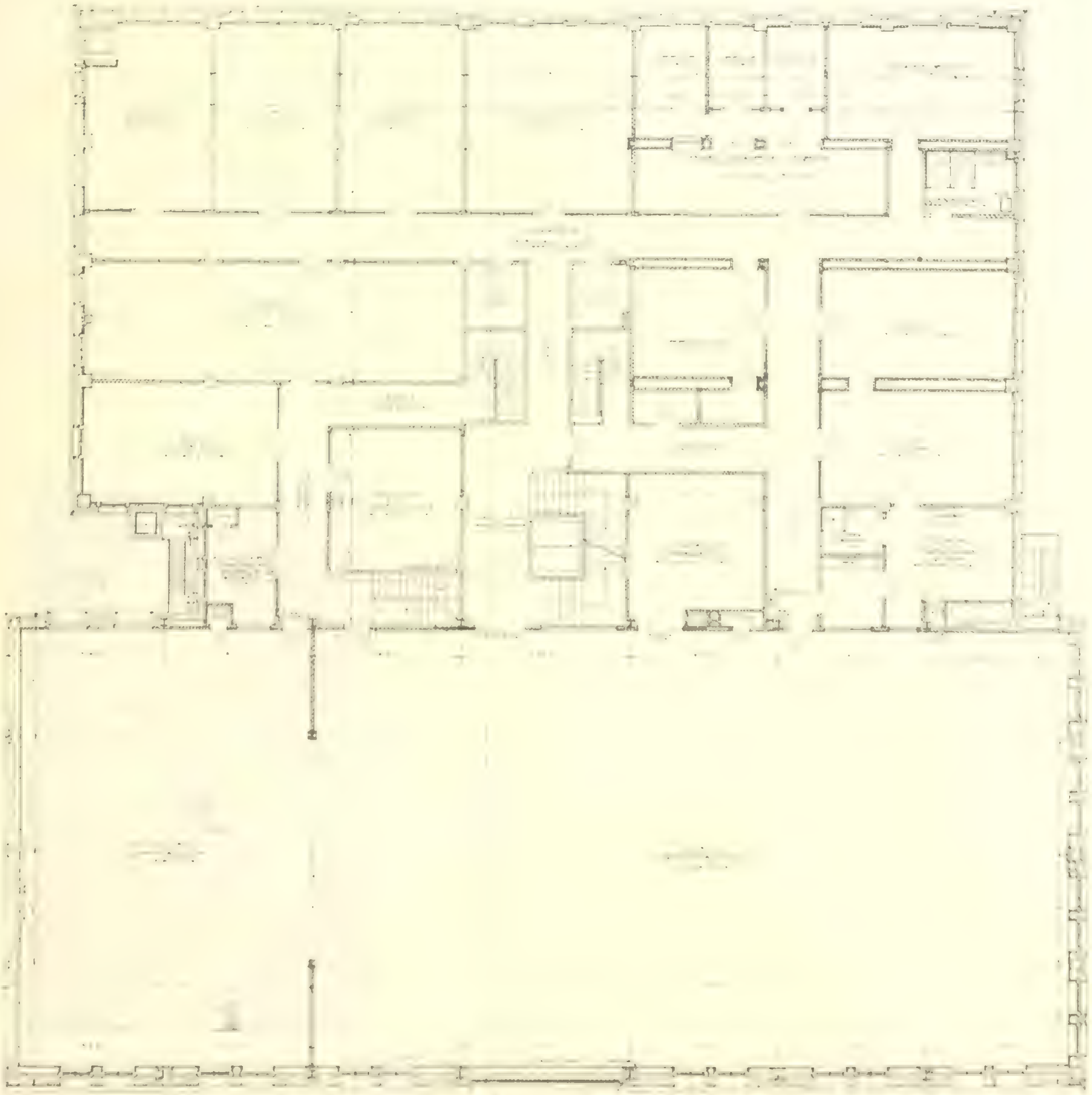
The length of the roadway, which extends right through Burnaby and was formerly known as the Vancouver-Westminster road, is approximately 4.4 miles, and the contract provides for a 46-ft. roadway between curbs from Edmonds to Tenth avenue, New Westminster, and a 30-ft. roadway between curbs from Edmonds to the Boundary road at Central Park, on the South Vancouver boundary.

The Railway Committee at Ottawa has authorized the construction of a new C. N. R. line from Montreal to St. Levis, P.Q. It will cross the St. Lawrence and follow the south shore to Levis

The New Y. M. C. A. Building at Vancouver

PLANS of the new Y. M. C. A. building at Vancouver were completed recently, and the contract has been awarded to Messrs. Booker, Campbell & Whipple, Limited, of Vancouver, who will immediately commence constructional operations on the site chosen on Georgia street extending through to Alberni street, between Burrard and Thurlow streets. The programme of the board of directors of the Y. M. C. A. contemplates the erection of at least three association buildings. The building on Georgia street will be the central branch or radiating centre. After its completion, it is intended to erect a branch building in the eastern district, and another in the southern district of the city, in which special provision will be made for the boys of those suburban sections.

The site on Georgia street was purchased at a cost of $70,000. The central building is to cost $350,000 and the equipment and furnishings $50,000. The two branch buildings will cost $65,000 each, making a total of $600,000. To meet these obligations, the association has money subscribed to the value of $525,000, and the present property on Cambie street is valued at $100,000, making the assets $600,000. The building to be erected on Georgia street will mea-



Second Floor Plan, Vancouver Y M C A Building [illegible] 101 feet. It will be of reinforced concrete and steel construction, the first two storeys being of steel. Terra cotta will be used in the first storey, while the succeeding five storeys will be faced with red paving brick, and the top storeys will be terra cotta, with galvanized iron cornice. On the Alberni street frontage, the exterior facing will be red paving brick with terra cotta trimmings. All interior [illegible] work will be B. C. fir. The entrance on Georgia street and the vestibule on both entrances will be decorated with terra cotta. The basement floor will contain a cafeteria, kitchen, barber shop, lockers, swimming pool, general lavatory, shower baths, boiler rooms, and attendants' rooms. The swimming pool will be a feature of the building. It will measure 75 feet by 24 feet, with a depth of 7 feet 9 in. at the deepest end, grading to 4 feet 3 inches, at the other end. The walls of the room in which the swimming pool is located will be lined with white enamel tile. The swimming pool and the floor of the room will be of white hexagonal tile, and there will be a white terra cotta life-rail. There are two spectators' galleries in this room. The floor of the locker rooms will be of cement, while the floor of the cafeteria will be of terrazzo. A filtration plant will be installed to purify the water before it enters the swimming pool.

Y. M. C. A. Building, Vancouver, as it will appear upon completion.

On the first floor will be located the reception lobby, social room, club room, reading room, writing room, the general offices, committee rooms, auditorium and banquet hall, boys' game room, together with coat rooms, and dressing rooms. The reception hall is to be pannelled in B. C. fir, and the boys' lobby pannelled in burlap. On the second floor there will be a main gymnasium and an auxiliary gymnasium, together with boxing and wrestling rooms, fencing room, physical director's room, club rooms, employment department and class rooms. The floors of the gymnasium will be of maple, the walls of main gymnasium lined with buff brick and walls of auxiliary gymnasium with cement plaster. All the other rooms on this floor will have a covering of battleship linoleum, with the walls plastered with ordinary plaster.

The third storey will comprise the running track, which will have a fir floor covered with felt. The gymnasium will extend in height for two storeys. Besides the spectators' gallery, there will be located on this floor a private dining room, ministers' parlor, ladies' parlor, library, museum, educational secretary's room, five class rooms and rooms for headquarters of supervisory and extension agencies.

The fourth, fifth, sixth and seventh storeys will be set aside for bedrooms. On each floor there will be about forty-three bedrooms and one large dormitory. Accommodation will be provided for about seventy-seven persons on each floor, making in all, living accommodation for nearly 320. One big lavatory will be provided for each floor, and each room will be equipped with a telephone. The floors of the dormitories are to be of cement.

Located on the roof will be the laundry. It is placed on the roof in order to save space in the basement. One passenger elevator will be in use. Steam heat will be the system used, and the building will be equipped with an oil-burning apparatus. The building will be ventilated by a system of fan ventilators, which will change the air about four times every hour. Mr. H. S. Griffith, Vancouver and Victoria, is the architect.

The St. Lambert plant of the Canada Brick Company is now operating at full capacity and has been turning out about 20,000 bricks a day since the first of the year.

In a paper recently read before the Vancouver Chapter of the B. C. Society of Architects on the subject of specifications, Mr. W. C. F. Gillam drew attention to the criminal way in which scaffolding is erected on many buildings in Vancouver. It is interesting to note that this subject was brought to the attention of the Labor Commission which sat recently in Vancouver. The architects must be given credit for being the first body to direct attention to this matter.

Evidences of Fort William's progress are not lacking these days. In addition to the building of factories, the erection of elevators, annexes to the present elevators, new docks, freight sheds and storage facilities of all kinds, the Board of Education have decided that the city's twelve schools must have increased accommodation and have arranged for four additional rooms to be built to the Ogden street school and a like number to the Isabella Street School. They have also asked the building committee to report on the advisability of building another school in Ward Four.

Mr. Geo. T. Clark, City Engineer of Saskatoon, who has been elected 2nd vice-president of the American Society of Engineering-Contractors.

Experts Explain Toronto's Proposed New Water System

At a meeting held in the City Hall, Toronto, on February 11th, Messrs. J. G. Sing, Willis Chipman and Isham Randolph, three of the experts chosen to report on the new water supply system for Toronto, presented to the City Council their reasons for their choice of Scarborough Bluffs as the most suitable location for the new waterworks.

Dr. J. W. S. McCullough, Chief Officer of Health for Ontario, to whom the plans for the new system will have to be finally submitted, was present, as were also Mr. Robert Howe, chief engineer of the Canadian Underwriters' Association, who is well acquainted with the waterworks systems throughout the Dominion, and Dr. C. J. Hastings, Medical Officer of Health, Toronto.

Mr. J. G. Sing

Mr. Sing, who was the first speaker, acknowledged the opportunity of explaining the system, but stated that he thought the meeting should have been quite an unnecessary one. He explained that he and his colleagues had gone into the needs of the city very carefully and made careful surveys and examinations in connection with every detail of the question. He, personally, had charge of the marine end of it, of the soundings, surveys of Lake Simcoe and the water front of Toronto, which extends for twelve miles. The question was not a new one to him and he was familiar with it to a degree. They had made recommendations with the view of increasing the present water system and then dealt with the question of the future supply. Off Mimico it was found that the lake bottom was ideal for giving permanent structures, which will last a lifetime and be practically impervious to water and sand. The same condition of things existed off Scarborough. The question of tunnelling was an important one. Without the sanction or knowledge of the board he had taken upon himself to bring here one of the best experienced men on the American continent in regard to tunnelling, particularly in subaqueous work, and had outlined to him what he thought proper. This expert had concurred in everything that had been suggested, as far as the tunnelling was concerned.

"I felt safe then," proceeded Mr. Sing. "When the question of an intake came up, Mimico was suggested, but, considering the immense amount of surface drainage there, we decided on Scarborough. Laying an intake in such a depth of water had never been attempted. For the tunnelling I prepared the plans myself. I took these to three contractors, two Canadian firms and one American, and they gave me their price for the construction. They were, and still are, willing to undertake the work at that price and carry out the work to a successful completion, putting up the necessary bonds you may demand."

Mr. Sing continued by saying that considerable criticism had been levelled at the suggestion to pump water uphill into the reservoirs only to let it run down-hill again. He said that the advantage of having these reservoirs was that a reserve of 130,000,000 gallons, which could be extended at any time, would be available at all times and would keep the city supplied with water in case of an emergency, for at least two days. The trouble with the Island was its instability, as it had already practically turned over three times, and the intakes were now placed on [illegible]

Mr. Willis Chipman

Mr. Willis Chipman was the next member of the Board to address the meeting. He had taken great pains to make his explanation as lucid as possible and to this end had prepared a number of pictures in connection with the proposed system. These pictures were shown upon a screen and explained in detail. Mr. Chipman dwelt upon the absolute suitability of the Scarboro' site: firstly, because the possibility of pollution was just one-fourth of the probability of the same menace at the present Island plant; secondly, that the new intake would be seven miles from the sewage outlet; thirdly, between the Woodbine and Higland Creek there are no streams running into the lake—no sewer outlets can be constructed between these points because of the height of the shores above the level of the lake; fourthly, because of the fact that no factories can be made financially successful if located there, on account of the high land, no wharfage facilities or transportation. Under these circumstances there can be no fear of sewage or other sources of pollution entering the lake near the Scarborough intake between the two points mentioned.

"The reservoir is not essential, but it guarantees a supply in case of emergency," Mr. Chipman continued. "It has been argued that the loss of head in supplying the city by gravitation would be very great. There will be no less of head. There is in the present system, but after all at John street there is a head of 250 feet. At the high level station they are pumping it again another 130 feet, making 380 feet in all. Our mains will be sufficient for ten years to come to meet all requirements. The reservoirs can be increased as desired. We say our plan is possible."

Mr. Chipman warned the city that it should not depend on Niagara power altogether. "Some day you will wake up to find yourselves without light, or street cars, or water, or power to run your factories," he said.

Mr. Isham Randolph

Mr. Isham Randolph, Chicago, then read a paper giving his views on the subject. He said that his reason for reading a paper was that there might be no difference of opinion at some future date regarding his statements.

After remarking that he presumed an abundant supply of pure water was the first essential and that within reasonable limits the question of cost was a secondary consideration, Mr. Randolph said that in his home city of Chicago, since the urban pollution has been largely, almost wholly, diverted from Lake Michigan, the water was drunk without filtration, chlorination or treatment of any kind and that Chicago had attained a degree of freedom from water-borne diseases which placed it high upon the list of healthful cities. He then dealt extensively with the question of the water mains, reservoir and filters, and the operative cost of the present system as compared with that of the proposed system. He then summed up as follows:

"If you want the best water, you will go to Scarborough for it.

"If you want the highest insurance against fire losses, you will adopt the Scarborough reservoir.

"If you want to guard against interruptions due to the rupture of mains between intake and shore, adopt the crib-work tunnel leading from it to the shore pumping station.

"If you want to minimize the evil effects upon the water supply produced by storms, adopt the Scarborough project.

Speaking for his two companions, he closed his speech by stating:—

"The claims we make for the Scarborough Heights project are:—

"First, a safer supply of potable water than can be had from any other site considered by us. A vital consideration.

"Second, a more flexible system of supply than can be obtained by any direct pumping system.

"Third, a supply which guards against interruption due to breaking down of pumps or to clogging and disruption of intake mains—accidents from which Toronto has suffered.

"Fourth, a supply which will meet sudden demands or peak loads without increasing the burden on the pumps.

"Fifth, a supply which will care for the high level [illegible] and which may be drawn upon to supply shortages in the low load years.

"These [illegible] are manifestly founded on the facts in the case."

At the close of Mr. Randolph's paper Mr. Chipman said that he and his colleagues would be willing at any time to further explain the system, but they would not attempt to defend it, as it needed no defence.

Personal Mention

Mr. W. E. Skead has been appointed city electrician of Brandon, Man.

Mr. A. A. McQueen has been appointed assistant power engineer of the Winnipeg municipal system.

Mr. T. Towns is the new town engineer and electrical inspector of Rapid City, Man.

Dr. A. E. Ross, M.P.P., will represent the city of Kingston, Ont., at the convention of the Ontario Good Roads Association in Toronto.

Mr. F. L. Fellowes, City Engineer of Vancouver, returned to the Pacific coast city recently after a well-earned vacation spent in Montreal and other eastern cities.

Mr. John Wilson, formerly city engineer of Fort William, is now associated with Messrs. Flanagan & Murphy, contractors, of that city.

Mr. S. Frank Peters, F.R.A.I.C., Licentiate R.I.B.A., is a well known practising architect at Winnipeg. At the outset of his professional career he had the advantage of a careful training in his father's office at London, Ont. Here he also obtained an insight into civil engineering practice. From London he went to Toronto and studied architecture in that city with the late Wm. Irving. Later he went to Rochester, N.Y., and in 1872 returned to London, Ont., where he established himself in architectural practice. Mr. Peters went to Winnipeg in 1892, and has practised there ever since.

Mr. S. Frank Peters, Winnipeg

Mr. C. S. Gzowski, of the well known contracting firm of Macdonell, Gzowski & Co., Vancouver, was a visitor to Toronto last week.

Mr. Geo. Ross has been appointed to take charge of road work in Welland county, and Mr. James McKeown is the new Superintendent of Highways for the same district.

Mr. F. J. Gibbons, formerly sales manager for the Macbeth-Evans Glass Company, has been appointed to a similar position with the Jefferson Glass Company.

Mr. F. A. Creighton, for several years city engineer of Prince Albert, has been appointed manager of the civic hydro-electric development work at LaColle Falls, some 15 miles out from Prince Albert.

Mr. R. M. Hannaford has been appointed acting chief engineer of the Montreal Tramways Company, following the resignation of Mr. J. D. Evans, chief engineer, a few weeks ago.

Mr. A. W. Fawkes, the new waterworks engineer at Calgary, was formerly chief assistant engineer at Minneapolis, having charge of the installation of a mechanical filtration plant.

Mr. R. J. Miller, Montreal, has severed his connection with the Canadian General Electric Company, having accepted the position of sales manager of the Engineering Equipment & Supply Company, St. James street, Montreal.

Mr. H. E. Bates, of the staff of the Board of Engineers on the Quebec Bridge, left Neilsonville, Que., last week to represent the Board on some tests that are being made at the testing laboratory of the Phoenix Bridge Company, Phoenixville, Pa.

Messrs. W. A. Cameron and J. A. McLaren, contractors, of Ottawa, recently arrived in Vancouver, the object of their visit being to figure on the cost of dredging False Creek as decided upon by the Dominion Government. It is understood this firm will put in a tender for the work.

Mr. A. H. Chave, general purchasing agent of the Canadian Car and Foundry Company, has been appointed general assistant to the executive for that company. Mr. Chave is a director of the Platt and Latchworth Malleable Iron Company, and of the Canadian Steel Foundries.

Mr. J. R. Wemlinger, president of the Wemlinger Steel Piling Company, has been re-elected for the second time secretary of the American Society of Engineering Contractors, with headquarters at 11 Broadway, New York, and branches in Chicago, St. Louis, Indianapolis and Regina, Sask.

Mr. Geo. T. Clark, City Engineer of Saskatoon, Sask., was elected Second Vice-President of the American Society of Engineering Contractors at the recent annual meeting of that body. The new president is Mr. Howard J. Cole, of Mountclair, N.J., and the 1st vice-president is Mr. Edward Wegmann, of New York City.

Mr. Alfred Still, chief electrical engineer to the Algoma Steel Corporation and for the past year located at Magpie Mine, where he has had charge of the installation of a generating plant and transmission line, has resigned his position to associate himself with the School of Electrical Engineering of Purdue University, Lafayette, Ind.

Mr. William Johnston Sproule, who retired two years ago from the position of assistant chief engineer to the Montreal Harbor Commissioners died recently at his home at St. Lambert. Mr. Sproule was associated with the Commissioners for 30 years, the whole of his professional life, with the exception of four years he spent in railway construction in California and Pennsylvania. He was a member of the Canadian Society of Civil Engineers, and served on the Council in 1895 and 1896.

Mr. Richard S. Buck, M. Am. Soc. C. E. has retired from membership in the firm of Sanderson & Porter, Engineers and Contractors, New York City, to become Chief Engineer of the Dominion Bridge Company, Montreal Que. Mr. Buck graduated from Rensselaer Polytechnic Institute in 1887. He was Resident Engineer during the construction of the famous Niagara River steel arch bridge; the Williamsburg bridge, East River, New York, was built under his supervision, and for a number of years he was Chief Engineer of the Department of Bridges of New York City.

Mr. P. H. Kemble, for the past year general sales manager of the Toronto Electric Light Company, is resigning to accept the position as manager of the commercial department of the Union Gas & Electric Company, of Cincinnati, Ohio, resignation to take effect February 18th. Mr. Kemble will be greatly missed in and around Toronto, for, during his brief sojourn in Canada he has been particularly active in promoting the interests of the electrical business. In the Canadian Electrical Association, the Toronto section of the A. I. E. E., the Sons of Jove and in his company's own section of the N. E. L. A., he has been uniformly interested and helpful and will leave many friends who wish him continued success in his larger sphere of activity.

Canadian Railroad Development

The Grand Trunk Railway will start, as early as possible in the spring, the construction of six new tracks for freight purposes in London, Ont.

The Canadian Central & Labrador Railway is to apply to Parliament for powers to build a railway from Cochrane in a northeasterly direction to a point at or near Cape St. Lewis on the Atlantic coast, with a branch line to a point near the mouth of the Hamilton River, Quebec, and also a branch line to the city of Quebec.

It is stated that, at the present rate of progress in track laying, the Tofield-Calgary branch of the Grand Trunk Pacific should be in the latter city within the next month. The company has 130 men at work laying steel, and these are now at Irricana, about 45 miles out of Calgary, laying about a mile and a half of steel every day.

Work has been started by Foley, Welch & Stewart of Spokane and St. Paul on their contract for the construction of the Pacific & Great Eastern Railroad from Vancouver, B.C., northeast. The new line will follow the course of the Fraser River and will open up a new territory. Mr. A. H. Sperry, Spokane, Wash., is General Manager of the road.

A considerable enlargement of the powers of the Ontario Railway and Municipal Board is contained in the proposed Ontario Railway Act, a revision and reconstruction of the present Act, which is now before the Legislature. A far-reaching clause is that dealing with the right of the Board to order the construction of spur lines or branches upon the application of an industry.

Vancouver promoters of the Pacific and Hudson Bay railway are asking the Federal Government to guarantee bonds for the building of a railway from Bella Coola, northeastward through central and northern British Columbia, through the Peace River country, thence [illegible] the Pine River Pass and eastward on to Hudson Bay. It is intended to make a start this summer if the Government will guarantee the bonds of the [illegible] miles now contemplated.

The Canadian Western Railway Company will apply to Parliament at its present session for an act extending the time for the commencement and completion of its lines and by partially changing the route [illegible] that the line shall be built "from a point on the international boundary, near Coutts, Alberta, in a [illegible] and westerly direction to Cardston; thence in a northwesterly direction through the town of Pincher Creek."

Messrs. Foley Bros., Welch & Stewart, Winnipeg, have secured the following new grading work from the C. P. R. for the coming season: Gimli, north, 22 miles; westerly extension, Weyburn branch, 145 miles; Gleichen-Shepherd, 40 miles. Together with the following double track work: 31 miles, Whitewood-Grenfell, Saskatchewan; 400 miles, Indian Head-Regina, Saskatchewan. The above work amounts to about 7,000,000 cubic yards, mostly earth, prairie grading.

The development of Ogden, the home of the new shops of the Canadian Pacific Railway in the West, is a twentieth century miracle. Where only a few months ago was bald prairie is now a hive of industry, and in a very few weeks the great shops of the Canadian Pacific Railway will be actually in use, though not fully working. It is stated that in the early spring a thousand mechanics and their families will be moving to Ogden from Winnipeg to take up work in the new shops.

The Athabasca & Grand Prairie Railway Company is to have a bill introduced at the present session of Parliament to permit the construction of a line of railway from some point at or near the junction of the Solomon River, with the Athabasca River in Alberta in a northwesterly direction to a point at or near the junction of the Smoky River with the Muskeg River in Alberta, thence by the most feasible route in a northerly direction to Dunvegan in Alberta, passing through Grand Prairie at a point on the westerly side of Bear Lake.

The new roundhouse which is being constructed for the Grand Trunk Railway System by the John S. Metcalfe Company, at St. Lambert, Que., is rapidly approaching completion, and will furnish accommodation for housing and repairing 27 locomotives of the largest type. The structure comprises:—Roundhouse, machine shop, boiler house, fan house, office and stores, castings store, and sundry accessories, is constructed in concrete, steel, brick and timber, the whole being built on concrete foundations carried down to solid rock.

The Canadian Pacific Railway has opened offices in Sudbury, and is making preparations for the double tracking of the line from Sudbury to Port Arthur. There is now in the field on survey work a staff of 72 men, in six gangs, and every possible route is under scrutiny. The work is in charge of Mr. D. Hillman, assistant engineer of eastern construction. It is stated that the work of surveying, engineering and constructing the new double track of the Canadian Pacific Railway system between Sudbury and Port Arthur will occupy two or three years, before it is finally complete. Last year seventy-five miles of double tracking was accomplished west of Cartier.

The Grand Trunk Pacific end of the National Transcontinental Railway is making good progress towards completion, Messrs. Foley, Welsh and Stewart having recently sublet the final 140 miles of construction on the west end of the line. This section lies between Fort George and Fraser Lake. It was the intention of the contractors to withdraw the letting of these contracts until spring, but owing to the anxiety of the Grand Trunk Pacific company to complete the line through to the coast before the snow flies the contracts were all let. On the west end the big bridges across the Porphy and Boulder rivers, have been completed. The steel gangs have been pushed over these bridges and they will continue their course till they reach Telqua. At the present time less than 400 miles of gap separate the two ends of steel west and east, and little difficulty is anticipated in finishing this year and in running trains through to Prince Rupert from Winnipeg

Mainly Constructional

The News in Brief—From Coast to Coast

A new building [illegible] before the Council of Westmount, P.Q., [illegible] houses in certain parts of the city.

Medicine Hat's building permits for the month of January 1913 show an increase of $11,000 over the same month of 1912.

The seventh annual convention of the Canadian National [illegible] Builders' Exchanges is now being held at [illegible].

February 20th is the date fixed for the annual meeting of the Canada Cement Company, to be held in the Windsor Hotel, Montreal.

The Montreal Board of Control have given two months' leave of absence to Mr. J. E. Dore, city sanitary inspector, owing to ill-health.

It is estimated that the amount of money available for expenditure by the engineering department of Burnaby, B.C., [illegible] ,000.

The sum of $50,000 for the improvement of navigation on Rainy River was one of the items which appeared in the recent Government estimates.

Business on hand will keep the Canadian Car and Foundry Company busy until September next, the orders on the books totalling 45 million dollars.

Work has been started on the bridge over the Saskatchewan river, at the foot of Fifth street, Edmonton, which is being built by the city at an estimated cost of $175,000.

Building operations are being carried on steadily in Moose Jaw in spite of the very cold weather—fire pots, hot mortar and warm concrete being used to combat the frost.

The annual meeting of the New Brunswick Society of Domestic, Sanitary, Heating and Plumbing Engineers, was held at St. John recently. The election of members will be held at the next meeting on Friday, July 8.

Ottawa brick manufacturers recently announced a heavy advance in the price of brick. High grade veneer brick goes up from $12 per M. to $14 per M. and the cheaper grades have also undergone a substantial advance.

The Victoria Chapter of the B. C. Society of Architects have asked the Victoria School Board to select school plans hereafter in public competition. During the year 1912 the work has been given largely to one architect.

It is expected that approximately $250,000 will be expended on the construction of the Presbyterian Theological College at Saskatoon. The contract for the first wing of the building has already been given at a cost of $54,000.

Mr. J. W. Turner, of Edmonton, has purchased three blocks of land on Twelfth avenue south. Mr. Turner was acting on behalf of a Toronto syndicate who, it is stated, will build a large number of modern residences on this land.

Works Commissioner Harris, Toronto, reports favorably on the widening of Ryerson avenue from Queen street to Wolseley street to fifty feet, the same as the northern section of the street. The cost of the widening is estimated at [illegible]

A deputation of farmers from the Port Arthur and Fort William district called upon Mr. J. W. Bennett, superintendent of colonization roads, recently, to discuss the season's road programme and to urge the construction of the colonization road from the Twin Cities to the Minnesota boundary. Across the boundary the State authorities are constructing a road from Duluth to the Canadian boundary, and the building of the Ontario section would provide a through road from the head of the lakes to Duluth. The Ontario section would be about forty-five miles long.

George T. Davis & Sons have been awarded a contract to build at their shipyards, Levis, Que., six steel scows for the Department of Public Works. The firm is also completing a large steel screw hopper dredge for the Marine Department.

The contract for the supply of 6, 8 and 12-in. steel pipe for the Vancouver waterworks department was recently awarded to the National Tube Company, Pittsburg, the Wilkinson Company, Limited, Vancouver, being the local agents. The price was $143,000.

The Canadian Granite and Marble Dealers' Association held a convention at Toronto on February 10th, some forty members being present. Mr. Pollard, Niagara Falls, gave an address on "The use and care of pneumatic tools," and an interesting discussion followed.

The Ceresit Waterproofing Company have added to their staff a Superintendent Devartment in charge of Mr. John J. Lyons. It is the aim of this department to superintend any structure where engineers or architects desire to have a check on the contractors on the waterproofing work.

A deputation from the counties of Ottawa, Labelle, Argenteuil, Two Mountains, and Laval have asked the Hon. J. E. Caron, Minister of Agriculture for the province of Quebec, to construct a main highway from Montreal to Hull and Ottawa. Another deputation have requested the construction of a road from Huntingdon to Montreal.

Messrs. Baines & Peckover, Toronto, have taken over the agency for The Consolidated Expanded Metal Company's "Steelcrete." This was formerly handled by Messrs. Alfred Rogers, Limited, but the large increase in the cement and crushed stone business of the latter firm has made it necessary for them to give it their undivided attention.

The work of constructing the C. N. R. Mount Royal tunnel has been interferred with owing to a serious leak from a sewer into the main tunnel. A temporary sewer was constructed and the water pumped through this, but the leak continued, resulting in several feet of water in the main tunnel, which was kept down by the pumps in two shafts.

The officers for the Vancouver Branch of the Canadian Society of Civil Engineers for 1913 were elected recently. The following were chosen to fill the executive positions: Chairman, Mr. G. R. G. Conway; vice-chairman, Mr. L. G. Robinson; secretary-treasurer, Mr. F. Pardoe Wilson. Executive committee: Messrs. C. E. Cartwright and W. A. Clement.

A meeting was held at Richmond, Que., recently, to discuss the good roads question. Representatives were present from several of the neighboring counties. The resolutions adopted favored the construction of a road system by the Government, consisting of a main trunk road between Levis and Richmond, and the U.S. border, Sherbrooke and Montreal.

Mr. Chenevert, the head of the incineration department of the city of Montreal, has suggested to the controllers the division of the city into 30 districts of about one square mile each, and the erection of a small incinerator plant in each district. This will do away with the cost of haulage to a central incinerator. The small plants will cost about $30,000 each.

Tenders on the construction of the Fort William Commercial Chambers, Limited, grain exchange building, were opened recently, but owing to the fact that none of the tendering contractors agreed to have the building ready for occupancy by the end of September. [illegible] were accepted. The contractors fear there will be difficulty in getting the structural steel in place in time to admit of the building being set up within the time specified. It is estimated that the building will cost nearly $250,000.

The award has been made in connection with the designs submitted to the National Sanitarium Association for the erection of a dispensary and institute building for the National Sanitarium Association. There were some nine competitive plans sent in. The first prize of $40 was awarded to Mr. Charles S. Cobb, and the second of $200 to Messrs. Denison & Stephenson.

The whole council of the city of Toronto are going to Ottawa to join the deputation from the municipalities of York, Victoria and Ontario counties who will wait upon the Dominion Government on February 6 to ask for a subsidy of some $6,500 per mile towards the cost of constructing the proposed electric radial line from Toronto to Markham and Port Perry.

Through the courtesy of the National Paving Brick Manufacturers' Association, of Cleveland, we have been favored with a limited number of season tickets for the Clay Products Exhibition, which is to be held at the Coliseum, Chicago, from February 26 to March 8. We shall be pleased to send one of these complimentary passes to any of our readers upon application.

The B. C. Transport Company, Limited, New Westminster, intends to erect a cement plant at Port Alberni, Vancouver Island, providing sample tests are as satisfactory as a preliminary test made recently. An option for a site has already been secured, and it is expected that the company will shortly announce its plans for the construction of the new plant.

The January 17 issue of the Surveyor (London, Eng.), is of a special character designed to commemorate the completion of twenty-one years of publication. In the introductory editorial article there is an interesting review of the progress that has taken place in the engineering and constructional fields. Doubtless the Surveyor will have received the congratulations of many Canadian readers.

The Dominion Steel Corporation, Sydney, are enlarging their nail plant. The company's wire mill is equipped not only to provide wire for the nail mill and galvanizing plant, but wire for sale as well, including wire already drawn to be made into nails. The new annealing department to supply that part of the wire market is being rapidly pushed forward to completion. This will absorb a considerable tonnage.

The city of Toronto has come to an arrangement with the public service companies restraining them from tearing up the pavements without a permit, except in cases of urgent necessity. Works Commissioner Harris recently met representatives of the Toronto Street Railway, the Consumers' Gas Company, and the Toronto Electric Light Company, and they agreed to ask for permits before tearing up the streets.

Arrangements are now [illegible] for the [illegible] of the two new vaudeville houses for Toronto. The main building of one will be on [illegible] street, with an entrance off [illegible] street, while the other will be erected on College street. The land for the [illegible] street theatre [illegible] and the building is estimated at $300,000. The chief interests in these enterprises are held by the [illegible].

The city of Montreal has [illegible] to The John McDougall Caledonian Iron Works Company, Limited, of Montreal, the contract for two twelve million Imperial gallon pumping units, at a price of $50,046. The units consist of two 20-inch three-stage Worthington Turbine Pumps, directly connected to 750 Brake Horse Power [illegible] High Speed Engines, running at [illegible] r.p.m. [illegible] pressure of 92 lbs. The three stage pump of the John McDougall Company was selected as a type that had already given the city very satisfactory service for a number of years, operating 24 hours a day. This makes the thirteenth pumping unit furnished to the city of Montreal by the John McDougall Company and Henry R. Worthington, aggregating a total pumping capacity of over one hundred million Imperial gallons.

Mr. W. A. Robinson, of Montreal, has designed a large hydraulic dredge for the port of Karachi, India, after studying local conditions on the spot, and a contract has been let for its construction. The Bombay Port Trust is also purchasing a dipper dredge designed by Mr. Robinson for dredging rock. Mr. Robinson is one of the leading dredge experts, and is a member of the Canadian Society of Civil Engineers.

The Montreal Board of Control have submitted the figures for proposed public works, totalling $3,500,000. These include $1,716,118 for permanent street pavements; $1,280,000 for permanent sidewalks; $527,550 for the water department, and $500,000 for sewers. The streets to be paved number one hundred and forty. It is proposed to purchase more boilers for the low level pumping station, and an electric pump for the high level station.

"Water Filtration" was the subject of a paper read by Mr. James O. Meadows (superintendent of the filtration plant of the Montreal Water & Power Company), at a meeting of the Society of Chemical Industry, Montreal, on January 31st. Mr. Meadows dealt with various forms of chemical and mechanical filtration, and described the systems being installed for Montreal and suburbs. He referred in detail to the rapid sand filtration process. Prof. R. F. Ruttan presided.

Mr. J. Keele, of the Canadian Geological Survey, has been detailed by the Dominion Government to make investigations of the clay beds in all parts of Canada, and to report on different clays as to their usefulness for brick and tile manufacture. According to Mr. Keele the clay proposition in Canada is more important than gold mining, and this country is just on the eve of the development of clays. The Western Provinces are dependent upon clay for building purposes, and in Ontario the use of brick is growing.

At the recent annual meeting of the American Society of Engineering Contractors an illustrated lecture entitled, "Fire: Its Effects and Its Prevention," was given by Mr. E. F. Croker, ex-Chief of the New York Fire Department, and President of the Croker National Fire Prevention Engineering Company, of New York City. Views of some of the principal fires that have occurred in New York in recent years were shown, bringing out in detail the effects of fire upon steel and concrete and upon the so-called fireproof buildings.

The ninth annual convention of the National Paving Brick Manufacturers' Association will be held at Chicago, March 3rd-5th. All arrangements have been completed and an attractive programme has been prepared. Canada is sure [illegible] to Chicago from Ontario and Quebec at this time to attend the Clay Products Exhibition which is to be held concurrently at the Coliseum. The Secretary of the Brick Manufacturers' Association is Mr W. P Blair, of Cleveland, Ohio.

[illegible] the city of Montreal, F Tremblay & Company, and the Bank [illegible] suffered owing to delays met with in building operations. [illegible]

[illegible] since the date when the estimate was made and on which the contract was based. The judge held that the action was not taken within the date laid down by law and therefore failed.

[illegible] School, Toronto, a 3-storey building of 18 rooms, is one of the new schools planned by Mr. Franklin E. Belfry, Board of Education architect. It is to be of red brick, with Indiana limestone trimmings, and is the central [illegible]. A feature of this school is through corridors, with stairways in direct line with the exits from the corridors. These exits are wide and have rounded corners, so that a large number of children could leave the building [illegible] if necessary, without being pocketed in corners.

A deputation representing the Interprovincial Highways and Bridge Committee waited upon the Hon. Robert Rogers, Minister of Public Works, recently, in connection with the movement for the improvement of highways and bridges between Montreal and Toronto and Montreal and Ottawa. They pointed out to the Minister that the improvements would facilitate the means of communication between these cities and the intermediate districts. The deputation especially urged the construction of a bridge to connect the Island of Montreal with the mainland, at a point in the County of Vaudreuil.

Messrs. Wilson, Swan, and Lafleur, the three experts appointed by the Government to consider the best site for the Quebec drydock, have submitted their report to the Minister of Public Works at Ottawa. They are unanimous in recommending that the entrance to the drydock on the Levis side should be at right angles to the persent drydock, which makes the entrance to the new drydock face the Island of Orleans. The chief engineer of the Public Works Department was in favour of the entrance being parallel to the present drydock, and in consequence the plans prepared will have to be altered.

A meeting of the Provincial Builders' and Supply Association of Ontario was held at the Builders' Exchange, Toronto, on February 12th. Representatives were present from Ottawa, Sarnia, London, Hamilton, Berlin and Toronto.

The President's address outlined a scheme for builders' organizations to form a provincial body and for representatives from the provincial bodies to make a national executive.

The election of officers for the coming year resulted as follows:—G. A. Crain, Ottawa, president; G. Gander, Toronto, 1st vice-president; T. R. Wright, London, 2nd vice-president; P. L. Fraser, Toronto, secretary-treasurer.

A total reduction of over $100,000 from the original tenders for the new Central Technical School, Toronto, is the result of a month's work by a special committee of the Advisory Industrial Committee of the Board of Education, which recently presented its report to the former body. The first tenders amounted to $1,454,185, and the committee, under Trustee Fairbairn, have brought these down to, in all, $1,325,205. The special committee recommended that the revised tenders be awarded as follows:—For general work, to Norcross Bros., for $1,082,700; heating and ventilating, General Fire Extinguisher Co., for $148,900; plumbing, to Fred Armstrong Co., Limited, for $42,600; elevators, to Turnbull Elevator Co., for $6,005; wiring, estimated at $45,000. The specifications are practically unchanged, and, with the exception of the omission of one of the elevators and other minor details, the new school will be as was planned at first. The committee insisted upon having as much work as possible done in Canada, and they have the assurance of the contractors that Toronto workmen will be employed almost altogether. The recommendation of the special committee was accepted by the Advisory Industrial Committee, and there is now no doubt that the new school will be started very soon.

The Canada Forge Company, Limited, Welland, Ont., are rushing to completion a temporary building to replace the one recently burned, and will positively have a part of their Forge Department in operation within a week, which is record time. This building will be covered within ninety days by a modern fire-proof steel constructed forge shop of the most advanced type, the contract for which has been placed with the Standard Steel Construction Company. This building is especially designed for the manufacture of forgings up to 40,000 pounds in weight each. The general dimensions of this building will be 100 ft. by 200 ft., with centre bay equipped with 20 ton electric crane 60 ft. span, and with two bays each to be served with a five-ton electric crane of 20 ft. span. At the end of this building and continuing a distance of 100 ft., there will be constructed a 60 ft. span electric crane runway, of 20-ton capacity, for handling raw materials and shipping. This will not only insure the Company against further interruptions in their production, on account of fire, but will greatly increase the scope of their work; and equipped as it will be with steam hammers, hydraulic forging presses, annealing and heat treating furnaces, it will be one of the finest forge shops on this Continent.

The Remington Arms Union Metallic Cartridge Co., with main offices in New York City, has decided to extend its factories into Canada, and has closed a deal for 100 acres of land at Windsor, Ont., on which they will erect a large plant. The construction of the cartridge plant will be started at once, and contracts for the first buildings have already been let to the local branch of the Canadian Frost Winchester Company. One of the units, it is expected, will be completed in April, and will employ 50 men. It is anticipated that in the near future several hundred men will be employed. The plant at the start will consist of one two-storey manufacturing building, fully equipped with modern automatic machinery, safety devices and fire protection apparatus, also a one-storey building for housing the delicate instruments and testing devices, and three powder magazines. The magazines are constructed with special ventilating systems and lightning arresters, and are surrounded by large and carefully designed earthwork embankments affording complete protection. In addition a power house equipped with the necessary boilers, pumping machinery, etc., will be immediately installed. Several hundred thousand dollars will be invested in this proposition.

Recent Happenings at Nanaimo, B. C.

Constructional developments at Nanaimo, B.C., are proceeding apace.

Operations were commenced recently upon an extensive addition to the Windsor Hotel. This will be a 5-storey brick block with concrete foundations. The building will be replete with all modern improvements.

A cable bridge carrying the pipe line across the Nanaimo river collapsed a week or so ago owing to a heavy fall of snow. The estimated damage to the bridge is about $8,000.

It is proposed to raise about 10,000 feet of 12-inch cast iron pipe at a lower level and cross the river over the Government bridge.

The ship "Oscar," carrying 58 tons of dynamite, blew up in the harbor about two miles from the city. The damage was about $20,000—chiefly in plate glass, plaster and chimneys.

At the time the foregoing information was received from the City Engineer Bennett, the tramway proposition was going through its third reading. It is expected that with the inauguration of trams the city will enter upon quite a boom.

Tentative Programme, International Road Congress, London

The Permanent International Association of Road Congresses has announced the following tentative program for the International Road Congress to be held in London next June:

Monday, June 23.—Opening meeting of the Congress under the presidency of the Chancellor of the Exchequer. In the evening a reception at the Guildhall by the Lord Mayor of London.

Tuesday, June 24.—Meetings of the sections. Discussions of the questions on the agenda of the Congress.

Wednesday, June 25.—Meetings of the sections. In the evening a reception by the Institution of Civil Engineers.

Thursday, June 26.—Excursions to the environs of London, and visit to roads in automobiles. Royal reception at Windsor. In the evening a reception at the Royal Automobile Club.

Friday, June 27.—Closing meeting of the Congress. In the evening a conversazione given by the Surveyors' Institute and performances in the various theatres of the capital, to which members of the Congress are invited.

Saturday, June 28.—Excursions in automobiles and visits to roads in the county of Kent, and in the suburbs of London. In the evening a banquet at the Hotel Cecil.

During the week following, long distance excursions to the principal quarries, mines, etc., and along the most interesting roads in various parts of the United Kingdom. In addition, a road exhibition will be held.

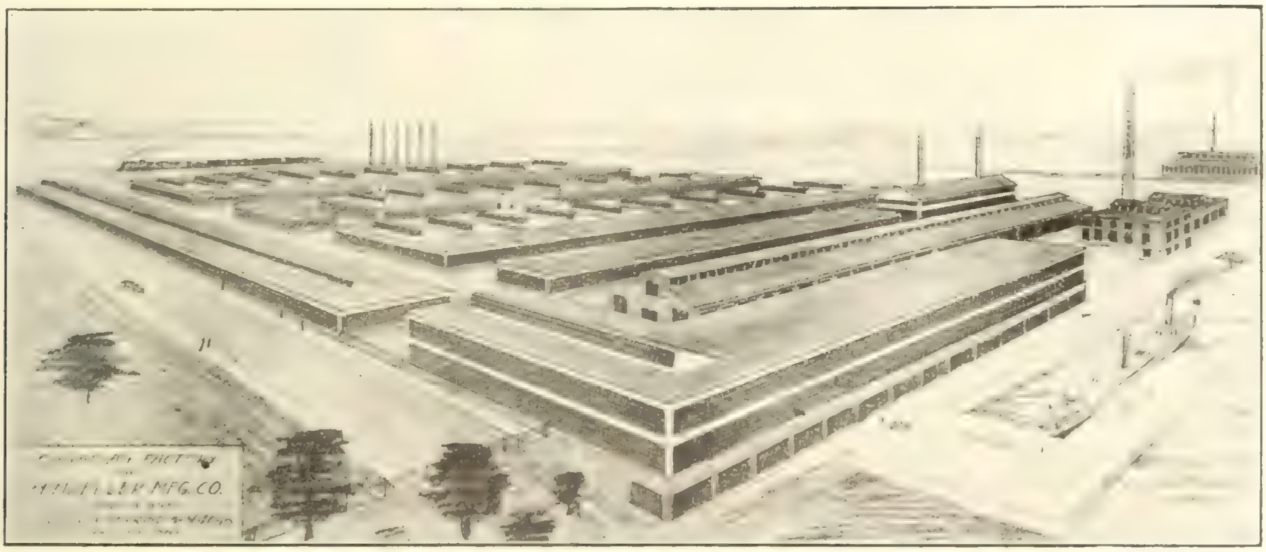
Standard Clay Products, Ltd., St. Johns, Que.

The Standard Drain Pipe Company of St. Johns, Que., has been reorganized under the name of Standard Clay Products, Limited. The officers of the company are: W. C. Trotter, president and general manager; Herbert Molson, Esq., vice-president; H. G. Perchard, secretary and treasurer; C. S. Trotter, of New Glasgow, assistant general manager; and H. H. Blackader, assistant secretary and treasurer. The directors are: W. C. Trotter, St. Johns; Herbert Molson, Montreal; G. H. Balfour, Winnipeg; Jas. Elliot, Montreal; S. H. Ewing, Montreal; F. W. Molson, Montreal; Lt.-Col. G. E. A. Jones, Quebec; Geo. McAvity, St. Johns, N.B.; and J. P. L. Stewart, Montreal. The new company is capitalized at $1,000,000, of which $750,000 is paid up. The company is building a 15-kiln plant at New Glasgow, N.S., in addition to the 10-kiln plant now in existence there, and is doubling the capacity of its fire brick plant at St. Johns to increase the output of locomotive blocks, stove and range bricks, and fire clay specials. The present fire brick kiln battery consists of four kilns, but will soon be increased to eight.

An Industrial Acquisition for Sarnia

An important industrial development at Sarnia, Ont., is the erection of a new foundry, for the manufacture of water and plumbing lines and brass goods, by the H. Mueller Manufacturing Company, Limited, of Decatur, Ill. The illustration shows the plant as it will appear upon completion. Operations are now in progress on three sections of the plant, one of which is now completed. The buildings will occupy a site of 75 acres. There are excellent transportation facilities, with the Pere Marquette Railway passing through the site and a wharf located on the river front.

The buildings now in course of construction were designed by Messrs. Prack & Perrine, industrial engineers, of Hamilton, and represent the last word in structures of this type. The construction is of concrete and steel, fireproof throughout. The roofs are of the saw-tooth type. Excellent light is afforded to every part by the large amount of glass in the building. The windows have steel sash and ribbed glass.



It is estimated that the output of the plant during the first year will be $150,000. One hundred and fifty men will be employed at the outset.

In establishing this plant, the Mueller Company have taken enterprising measures to ensure successful service to the Canadian trade. The manufacturing facilities, as well as all the lines manufactured at Decatur—together with a few additions, will be duplicated at Sarnia. The company will cater carefully and closely to Canadian requirements.

The general manager of the new plant is Mr. Oscar B Mueller, who has taken up his residence at Sarnia. Mr Mueller also has charge of the eastern United States business of the company and will continue in charge of the New York office. The practical supervision of the plant will be entrusted to Mr. Carl G. Heiby, who comes from Decatur, where he has been foreman of the tool-making department. Mr. F. L. Riggin will be the secretary, and the foundry foreman at Sarnia will be Mr. Richard Lan. The shipping and stock department will be in charge of Mr. C. W. Padgitt, who goes to Sarnia from the company's New York office. Mr. P. W. Blair will have charge of the brass finishing department, and Mr. G. P. Harry, of the advertising department at Decatur, will be transferred to the sales department at Sarnia.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Berlin, Ont.

[illegible] walks. The council has authorized the construction of new walks on both sides of [illegible] streets, curbs and gutters. Mayor, W. D. Euler. Town Clerk, A. H. Miller.

Bowmanville, Ont.

Waterworks, cost $111,000. Tenders received by Clerk, John Lyle, until March 19th. Plans and specifications at office of engineers, Chipman & Power, Toronto, and at Town Hall, Bowmanville. Mayor, S. C. Hillier.

Sewerage system, cost $39,000, planned by Town Council. Tenders received by Clerk, John Lyle, until March 19th. Plans and specifications at office of engineers, Chipman & Power, Toronto, and at Town Hall, Bowmanville, Mayor, S. C. Hillier.

Burk's Falls, Ont.

Extension of waterworks system, cost $8,000, planned by town council. Clerk, Chas. McArthur. By-law passed and work will start in June.

Edmonds, B.C.

Tenders received by Comptroller until March 3rd, 1913. For about 15 miles of steel water pipe varying in diameter from 3 ins. to 10 ins. Plans, specifications, etc., at office of engineer. Comptroller, W. Griffiths. Engineer, Cleveland & Cameron, 1001 Rogers Building, Vancouver, B.C.

Hamilton, Ont.

Sewers planned by City Council. Tenders received by Clerk, S. H. Kent, addressed to Mayor, John Allan, until Feb. 20th, for reinforcing steel and construction of pipe sewers on Cedar and Balsam aves., High street, Glendale and Kensington aves., King and Stirton Sts., Roxborough, Morris, Birch and First aves. Specifications at office of Secretary of Works Department, Hamilton. Engineer, A. F. Macallum.

Sewer is contemplated by city council on Glendale avenue. Mayor, John Allan. Engineer, A. F. Macallum.

Leamington, Ont.

Estimates are to be secured by the Council for improving the Selkirk drain. Clerk, R. M. Selkirk.

Lacombe, Alta.

Waterworks and sewerage systems planned by council. Mayor, C. B. Halpin. Secretary-treasurer, E. J. Tett. Engineer, R. E. McArthur, Lethbridge, is now drawing plans and will report on both systems ,either gravity system from springs four miles away or deep wells as [illegible] finally.

Le Pas, Man.

A bill will be introduced to authorize the town of Le Pas to construct and operate a system or systems of water works and sewers.

Ottawa, Ont.

The city council (waterworks dept.) contemplate purchasing C. I. manhole covers, etc., cost $7,000, for conduit system on Elgin, Gloucester and Laurier avenue. Mayor, J. A. Ellis. Engineer, Supt. Brown, City Hall.

Flush valves, cost $4,000, contemplated by city council (waterworks dept.). Mayor, J. A. Ellis. Engineer, Wm. Storrie, City Hall.

Sydney, N.S.

Waterworks, cost $75,000, planned by city council. Mayor, A. D. Gunn. Clerk, J. J. Curry. Engineer, D. McD. Campbell. New pumping station and pipe line. By-law carried.

Toronto, Ont.

Sewers. Council decided to accept plans of Works Commissioner Harris for a sewer system for the midway district. Mayor, H. C. Hocken.

Tenders received by Chairman until noon March 4th, for 24 in. and 30 in., 36 in. (a), 36 in. (b) and 42 in. cast iron pipes. Specifications and form of tender at office of Water Works Secretary, Dept. of Works, City Hall. Board of Control. Chairman, Mayor H. C. Hocken. Commissioner of Works, R. C. Harris.

Uxbridge, Ont.

Waterworks supplies. Required: 1 water wheel for 35 h.p., 1 steel pipe for penstock, 40 rods 6 in. cast iron pipes. Will probably be installed in April. Mayor, T. C. Nicholls. Clerk, M. H. Crosby. Chairman of Commission, Wm. Foster.

CONTRACTS AWARDED

Hamilton, Ont.

Sewers. Mayor, John Allan. Engineer, A. F. Macallum. Contracts awarded as follows: S. C. Cheeseman, King and Dundurn streets, Rosslyn avenue, Main street, Balmoral avenue, Magnolia avenue, $4,721. Sewers on Grosvenor and Rosedale avenues to be done by day labor.

Cement walks and curbs in east end planned by city council. Mayor, John Allan. Engineer, A. F. Macallum. Work to be done by day labor.

Water mains on Lancaster and Stirton streets, Biggar and Birch avenues, cost $3,434, planned by city council. Mayor, John Allan. Engineer, A. F. Macallum.

Winnipeg, Man.

Turbines, at $27,847 each. Engineer, J. G. Glassco, 54 King street. General contractor, Escher Wyss & Co., Zurich, Switzerland, or 514 Canadian Express Building, Montreal. Board of Control Secretary, M. Peterson.

Railroads, Bridges and Wharves

Briercrest, Sask.

C. N. Rly. Co.'s location of station at Briercrest, Sask., has been approved.

County of Middlesex, Ont.

Engineer in charge, C. E. Talbot, County Buildings, London, has recommended that 12 of the county bridges be replaced by new structures, cement and steel construction. Warden, A. K. Hodgins, London Twp.

Dist. of Sudbury, Ont.

C. N. O. Ry. Co. has been authorized to construct bridges (1) across Goose River (1st crossing) District of Sudbury, mileage 171.3 from Sudbury Junction, and (2) across Kabinakagami River. District of Algoma, Ont., at mileage 286 from Sudbury Junct., and also across Jackfish River, mileage 313.5 from Sudbury Junction.

East London, Ont.

Plans will be prepared at once for new sidings for C. P. R. to be built into the five new factory buildings the McCormick Mfg. Co. are to build in East London. Supt., Robt. King.

Land is being purchased for six large new sidings in connection with a plan to increase the yard room of the G. T. R. Work to start in spring. Supt., H. E. Whittenberger, Montreal.

Ft. William, Ont.

Engine house for C. P. Rly., head office, Montreal. Division engineer, I. C. Holden, Winnipeg, Man. Common brick construction, cement and piles foundation. Plans will be prepared.

Goderich, Ont.

Siding. The Council has granted the G. T. R. permission to construct line along the Maitland Road into Baechlers Mills. Work will start shortly. Supt., Chas Forrester.

Haileybury, Ont.

Alterations to dock, cost $9,500, contemplated by Dom. Government, Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Engineer in charge, V. La Flamme, Haileybury. Specifications at office of Department, Ottawa.

Hamilton, Ont.

Electric railway, Mountain Top, planned. Solicitors, Crerar & Awrey, Hamilton Prov. and Loan Building, are applying for charter for new company, distance of road about 9 miles.

London, Ont.

The C. P. R. will build a number of new tracks in the western end of the yards. Work will start in spring. Supt. Robt. King. Engineer, F. B. Tapley.

St. Catharines, Ont.

Station contemplated for the C. N. R. and also double track railway viaduct. Plans will be prepared. General Traffic Manager, Geo. C. Shaw. Resident Engineer, W. P. Chapman, Toronto.

Lethbridge, Alta.
C. P. Ry. Co. has been authorized to construct spur for A. Macdonald Co., Ltd.

Montreal, Que.
Railroad for The Central Ry. Co. of Canada. Location of line from Montreal, Que., to Midland, Ont., mileage 0 to 7 has been approved.

Provinces of Ontario and Quebec
Railroad. The Canadian Central & Labrador Railroad Co. will seek for power at this session of Parliament, to build railway from Cochrane in n.e. direction to a point near Cape St. Lewis on the Atlantic Coast, with a branch line to a point near the mouth of the Hamilton River, Quebec, and also a branch line to the city of Quebec.

Ottawa, Ont.
Sub station, cost $75,000, for Ottawa Elec. Rly. Co. Supt. Burpee, Albert St. The above cost includes construction of building and equipment. Cement foundation, solid brick construction, concrete and pine floors, felt and gravel roofing, electric lighting.

Port Burwell, Ont.
Dredging. Dominion Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by Secretary until March 3rd, 1913. Specifications, etc., at office of Dept., Ottawa, and MacLean Daily Reports, Toronto.

Sicamous, B.C.
C. P. Rly. Co. has been authorized to construct spur for the Columbia River Lumber Co., from a point on the main line at mile board No. 43.8 thence northerly and north-westerly across S.E.N.E. and N.W. quarters of Sec. 1-22-8-W.6 Initial Meridian, thence west across Lots Nos. 1035 and 528 Group 1, Kamloops, Division of Yale Dist., near Sicamous, B.C.

Sydney, N.S.
Bridge and culverts. Prov. Govt. Dept. of Public Works. Commissioner of Public Works and Mines, E. H. Armstrong, Halifax. Tenders received by Commissioner until February 20th, via Big Pond to County line 81 culverts, 32½ miles, from Sydney to Reserve Mines, 23 culverts, 7½ miles.

Twp. of Barton, Ont.
The T. H. & B. Rly. Co. has been authorised to construct spur for The Canadian Porcelain Co., Ltd., in Twp. of Barton, Co. Wentworth, Ont.

Toronto, Ont.
Tenders received by Mayor, H. C. Hocken, until noon March 11th, for bridge on St. Clair avenue, east of Bathurst street. Specifications, etc., from Railways and Bridges Sec., Public Works Dept., City Hall.

Winnipeg, Man.
Excavating, etc., for C. P. R. Division engineer, J. C. Holden. For excavating, back filling and laying pipe lines on the Manitoba division. Plans, specifications, etc., at office of Division Engineer who receive tenders until February 28th.

CONTRACTS AWARDED

Halifax, N.S.
Piers, George street, for Dartmouth Ferry Commission, Dartmouth, N. S. Architect, C. R. Thorne, Room 65, Metropole Bldg. General contractors, Standard Construction Co., 16 Prince street, Halifax. Plans are being prepared for a station. A large quantity of galvanized wire pit rope, 3/4-in. diameter, required.

New Westminster, B.C.
Harbor improvements planned by City Council. Harbor Engineer, A. O. Powell, 511-14 Westminster Trust Bldg. Clerk, W. A. Duncan. Cedar pile quay wall, Waugh, Meisner & Bailey, 16 Hastings street east, Vancouver, B.C. $146,892; 4 scows, Stead, Parsons & Ross, $4,825.

Southampton, Ont.
Pier, cost $10,000, Saugeen River, planned by County of Bruce. Clerk, P. A. Malcomson, Kincardine. Chairman of Commission, D. J. Izzard, Port Elgin. Engineer in charge, R. M. Dowall, Owen Sound. General contractors, Hunter Bridger & Boiler Co., Ltd., Kincardine. Two spans, iron and concrete substructure.

Public Building, Churches, Schools, etc.

Athens, Ont.
Interior fittings for post office. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by Secretary until February 20th. Specifications, etc., at office of T. A. Hastings, Clerk of Works, Postal Station "F," Toronto, at Dept. Ottawa, and MacLean Daily Reports, Toronto.

Belmont, Ont.
School, cost $4,000, Sec. 9-19. Secretary-treasurer, A. W. Venning. Tenders received by Architect, A. E. Nutter, Dominion Bank Building, from February 17th to 25th. One storey, 46 x 38, cement foundation, pressed brick construction.

Charlottetown, P.E.I.
Additions planned by City Council. Clerk, W. W. Clarke. City Engineer, Jno. P. Nicholson. Work includes alterations and improvements to police and fire stations in City Hall. Tenders received by Clerk.

Couitlam, B.C.
The School Board will erect an up-to-date school on Port Moody road. Plans in progress.

Duncans, B.C.
School planned by the Board. Architect, W. T. Whiteway, 543 Hastings St. west, Vancouver. Eight rooms. Plans, specifications, etc., at office of Architect and Secretary. Tenders received by Secretary, Jas. Greig, until February 25th, 1913.

Fredericton, N.B.
[illegible] planned by the School Board. Architect, [illegible] St. John. Tenders will be called the latter part of March.

Goderich, Ont.
Extension to gaol, cost $3,000, for County of Huron. Tenders received by Clerk, Wm. Lane, Court House, until March 15th. Two storeys, 35 x 22 ft. 6 in., cement foundation, reinforced concrete construction. Architect, J. Ades Fowler.

Hardisty, Alta.
The Town Council will erect a four-room modern school. The Trustees wish to get in touch with architects handling this kind of work. Secretary-treasurer, Alex. Mursell.

Hagersville, Ont.
Extension to church for All Saints' congregation. Tenders received by J. C. Ingles, Hagersville, until February 25th, 1913, for erection of 94 ft. tower, porch and guild room. Plans, specifications, etc., at Indian office, Hagersville.

Ottawa, Ont.
Addition to boat house contemplated by the Ottawa Motor Boat Club, Dr. McElhinney, Metcalfe street. Addition to accommodate 100 boats. Plans will be prepared.

Preston, Ont.
Skating rink, cost $8,000, for Preston Arena Co., c/o F. Bleiler. Architect, A. A. Gilmore, wishes information re ice manufacturing plant. 50 ft. high x 100 x216, cement foundation, frame construction, concrete floors, galvanized iron. Plans in progress.

Prince Albert, Sask.
Armory, cost $75,000, planned by Dom. Govt. Dept. of Militia and Defence. Secretary, E. F. Jarvis, Ottawa. By-law has been passed authorizing the municipal council to grant site for armory.

Regina, Sask.
Winter Fair building, etc., cost $134,000, planned by city council. Clerk, A. W. Pool. A by-law will be submitted to the ratepayers on February 25th, 1913, to provide for the raising of $134,000 for the purpose of constructing a winter fair building and amphitheatre, and to provide a heating system for the present auditorium building and adjoining stables at the Exhibition Grounds.

By-law will be submitted to ratepayers on February 25th, 1913, to raise $7,500 to remodel, improve and furnish the present market building, for the various civic departments and for installing therein public lavatories and baths and for acquiring weigh scales. Clerk, A. W. Pool.

By-law will be submitted to ratepayers on February 25th, to raise $117,000 for purchasing and installing health and [illegible] equipment and [illegible]ing a new incinerator and improving the present one. Also building of a trans[illegible] other necessary equipment to carry on the health department. Clerk, A. W. Pool.

Rock Island, Que.
Theatre for T. S. Haskel. Architect, [illegible] 42 x 80. Work to start as soon as weather permits. Plans in progress.

St. Mary's, Ont.
[illegible] mitted. Chairman, F. E. McLean.

St. Thomas, Ont.
[illegible]

[illegible] storey, 48 x 94 x 20, white brick construction. Plans drawn.

Sarnia, Ont.
A new Y. M. C. A. building is under consideration. Interested, Rev. Mr. Barraclough. Architect not yet chosen.

St. Vincent De Paul, Que.
Church, with cost $[illegible]. Tenders received by Architect, Alex. Daoust, 90 St. James street, Montreal, after March 15th. Two storeys, brick, cut stone construction, concrete foundations.

Toronto, Ont.
Hospital buildings, National Sanitarium Assn., 247 King street west. Secretary-treasurer, J. Dunbar, have awarded first prize for competitive plans to C. S. Cobb, 29 Brookmount Road, and second prize to Denison & Stephenson, 20 King street west. The Association have not decided [illegible] class of building they will erect.

School, cost $30,000, at Eglinton, contemplated by the Separate School Board. Secretary-treasurer, Rev. F. F. Rholeder, 172 Leslie street. Brick foundation, brick construction, felt and gravel roofing. Plans will be prepared.

Institution, cost $50,000, St. Patrick street, for Zionist congregation, Louis Gurofsky, Queen street west. Plans in progress.

School, cost $500,000, contemplated by the Board of Education. To be known as the "School of Finance." Location will probably be on Shaw street. Secretary-treasurer, W. C. Wilkinson, City Hall.

Vancouver, B.C.
Exhibition buildings, Hastings Park, planned by city council. Clerk, Wm. McQueen. Architect, G. M. Bayly, Dominion Building. Plans were selected in competition for the Fine Arts and Education Buildings, for the Vancouver University.

Westboro, Ont.
The Trustees of Baptist Church are contemplating the erection of a new church building.

Weyburn, Sask.
Interior fittings for post office, etc. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Interior fittings for Post Office, Customs and Inland Revenue Building, at Weyburn. Plans, specifications, at Dept. of Public Works, Ottawa, and at offices of G. J. G. Jarrett, Clerk of Works, Weyburn, and W. T. Mollard, Clerk of Works, Regina. Specifications also at MacLean Daily Reports, Ltd., Toronto. Tenders received by Secretary until February 26th, 1913.

Woodrooffe, Ont.
School, cost $12,000, contemplated by School Board. Architect, C. J. Burritt, 193 Sparks street, Ottawa, is preparing plans. Cement foundation, solid brick construction, felt and gravel roofing.

CONTRACTS AWARDED

Brantford, Ont.
Dormitory building, cost $50,000. Prov. Govt. Dept. of Public Works. Secretary, H. F. McNaughton, Parliament Buildings, Toronto. General contractors, P. H. Secord & Son, Ltd., 137 Nelson street. Plumbing, heating and ventilating, Drake-Avery Co., Ltd., 22 John street south, Hamilton, $22,000. Electric wiring, Lyons Electric Co., 61 Colborne street, $2,000.

Canora, Sask.
Hospital, cost $50,000, for Presbyterian Board of Home Missions. Architect, J. Pender West, 913 Somerset Building, Winniveg. General contractors, Hazelton & Walin, 322 Donald St., Winnipeg. Heating and plumbing, Frost & Co., Yorkton. Electrical, Shipman Electrical Co., Ltd., 396 Portage avenue, Winnipeg. Three storeys and basement, main buiidlng, 44 x 78.

Danville, Que.
Repairing School, District No. 4, for School Commissioners. Secretary, Henri Girard. General contractor, Leopold Theroux, Danville.

School, District No. 1, planned by the School Commissioners. Secretary, Henri Girard. General contractor, Jos. Frochette, St. George de Windsor, Que.

Hamilton, Ont.
Sunday school, cost $7,000, for Kensington avenue Methodist Church. Pastor, Rev. Wm. Corkery, 160 Avondale avenue. Architect, Herbert New, Spectator Building. Carpenter, T. J. Drake, 47 Earl street. Painting and Glazing, Geo. Smith, 219 Ferguson avenue south. Plumbing and heating, Adam Clark, Main street west. Plastering, Hannaford Bros., 232 Robinson street. Electrical work and fixtures, Chadwick Bros., King street east.

Hospital, cost $40,000, Euclid avenue, planned by city council. Mayor, John Allan. Architect, H. H. New, Spectator Building. Mason, Geo. F. Webb, Wentworth street south. Carpenter, T. D. J. Drake, 47 Earl street. Roofing, J. E. Riddell, King street east. Foundations in.

Lower Nicola, B.C.
School. Prov. Govt. Dept. of Public Works. Minister, Hon. Thos. Taylor, Victoria. Engineer, J. E. Griffith, Victoria. General contractors, Fowler & Lawson, Nicola.

Montreal, Que.
Immigration detention hospital, cost $75,000, St. Antoine street. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Architect, Ross & MacDonald, 1 Belmont street. General contractor, C. E. Deakin, 11 St. Sacrament street. Sub tenders received by General Contractor. Two storeys, 119 ft. 6 in. x 114 ft. 6 in., cement foundation, reinforced concrete.

Newport Que., Gaspe County
Church for R. C. Diocese. Architects, and general contractors, Ouellet & Levesque, 115 St. Jean, Que., from whom further particulars may be obtained.

Regina, Sask.
Power house, laundry and refrigerating plants. City Commissioner, L. A. Thornton. Consulting engineers, Wenger & Cockburn, Room 208, Aldon Block, Twelfth avenue. General contractor for power house, The Regina Plumbing & Heating Co., 1843 Hamilton street, at $40,983. General contractor for chimney, The Weber Reinforced Concrete Co., at $2,985. Refrigerating plant contract not let yet. Plants to be installed in connection with the Regina General Hospital.

St. John, N.B.
Post office, cost $381,850, Prince William street. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Architect, Geo. E. Fairweather, 84 Germain street. General contractors, Rhodes Curry Co., Ltd., Amherst, N.S. Electrical work, Vaughan Electric Co., Ltd., c/o Frank P. Vaughan, 94 Germain street. Excavating to start in about a week.

Toronto, Ont.
Cattle sheds, Exhibition Grounds. Mayor, H. C. Hocken. Builder, J. E. Russell, c/o Dill, Russell & Chambers, Toronto. Brick construction.

Picture theatre, for W. L. Joy, Dundas street. Architect, Remond & Beggs, Kent Building. General contractors, Orr Bros., 39 Queen street east. Terra cotta, F. Hankin, Mail Building. Iron and steel, Reid & Brown, 63 Esplanade east. Heating, plumbing and ventilating, Keiths, Ltd., 111 King street west. Glass and tile, Toronto Plate Glass Importing Co., Don Roadway.

Vancouver, B.C.
Jail building and police headquarters, cost $217,000, Cordova street, planned by city council. Clerk, Wm. McQueen. Architect, W. A. Doctor, Arts and Crafts Building, Seymour street. General contractor, Chas. F. Perry, 643 Howe street.

Victoria, B.C.
Theatre, Broughton and Blanchard streets, for The Victoria Opera House Co., Ltd., 101 Pemberton Block. Architects, Rochefort & Sankey, 217 Pemberton Block. General contractors for supply steel, The United States Steel Products Co., 706 McArthur Building, Winnipeg, Man. For erection of steel, E. E. Davis & Co., 837 Hastings street west, Vancouver.

Provincial Jail, cost $223,465, Wilkerson road, for Prov. Govt. Dept. of Public Works. Engineer, J. E. Griffiths. Minister, Hon. Thos. Taylor. General contractors, The B.C. Construction & Engineering Co. Two and three storeys, reinforced con. construction, fireproof presesd brick and terra cotta exterior, hospital section, laboratory, operating room. To be strictly up-to-date.

Winnipeg, Man.
Church, cost $60,250, for St. Edwards R. C. Congregation, Arlington street. Architect, D. W. Bellhouse, 703 Canada Bldg. General contractors, Fred Lewis Co., Ltd., 637-9 Somerset Bldg. Heating and plumbing, The Standard Plumbing and Heating Co., Ltd., 46 Provencher street. One storey and basement, 62 x 142, stone foundation, brick construction.

Business Buildings and Industrial Plants

Berlin, Ont.
Wholesale grocery building for the John Sloan Co., Church street, Toronto. Architect, C. Knechtel, Berlin, is preparing plans. Two storeys, 80 x 80.

Extension to hardware store of Wm. Knell & Co., King street west, contemplated. Three storeys, elevator required, fittings. Plans will be prepared.

Chatham, Ont.

Warehouse, cost $3,000, for Mr. Sidney Stephenson, 430 King street. Architects, J. L. Wilson & Son. Two stys., 37 x 41, brick foundation, brick, structural steel and iron construction. Plans drawn.

Factory, cost $40,000, for Chatham Auto Wheel Co. By-law carried by ratepayers February 6th. Machinery, etc., required. Plans will be prepared.

Dane, Ont.

Stamp mill planned for The Gold Leaf Co., Syndicate, Montreal and Three Rivers, Que. 25-ton stamp mill, to be in operation by spring.

East London, Ont.

Foundry, cost $100,000, for E. Leonard & Sons, York street, London. Two storeys, cement and stone foundation, white brick construction, hydraulic machinery. Plans ready.

Edmonton, Alta.

Business block, Whyte ave. west. The Masonic Order will erect 4-storey block in spring. Equipped with all conveniences and electric elevator. Stores on ground floor, offices and lodge rooms on others.

Farnham, Que.

Stationery manufacturing plant contemplated for F. Evans, Montreal. Plans will be prepared.

Fredericton, N.B.

Garage, cost $8,000, King street, for Mrs. Coles Kitchen. Architect not yet chosen. Tenders called in March. Further information from owner. 100 x 50, cement foundation, solid brick construction, concrete and spruce floors, felt and gravel roofing.

Hamilton, Ont.

Alterations to store, cost $5,000, for Firth Bros., 106 James street north. Architect, D. J. Corrigan, 231 Catharine St. N. Tenders received by owner. Tile floors, store fixtures and fronts.

Factory and warehouse, Barton street, for The James Dunlop Co., Ltd., 125 John street south, flour, feed, coal, etc. Plans in progress. Work to start in spring.

Store and restaurant, cost $15,000, Barton street east, for Phil Connor, Crown Point P.O. Architect, Fred Warren, 28 Tisdale street north. Two storeys, brick and stone construction, dance hall on upper floors. Plans prepared.

Le Pas, Man.

Bank building for The Union Bank of Canada, Head office, Quebec, Que. Plans in progress.

Montreal, Que.

Stores and residence, cost $12,000, for Louis Cohen, 516 Notre Dame street west. Tenders received by Architect, A. Decarie, 608 New Birks Building. Four storeys, 45 ft. 8 in. x 67 ft., brick, structural steel and cut stone construction, stone foundation.

Alterations to Windsor Hotel, Dominion Square, cost $10,000. Tenders received by Architect, H. C. Stone, 84 St Francois Xavier. General repairs and alterations to rotunda. Tile floors, marble counter, office fixtures.

Coal shed, cost $35,000, Western Ave., for Adam's Coal Co., 164 Notre Dame west. Architect, Adolphe [illegible], Hyde Park, Mass., U.S.A. 58 ft. high, 80 x 38, cement foundation, reinforced concrete construction, 1 freight elevator. Plans drawn.

Two stores, alterations, cost $15,000, St. Catherine West, for Mrs. Brodeur, 128 Stanley street. Tenders received by Architect, Rene Charbonneau, 15 St. James street. Four storeys, structural steel, cut stone construction.

New Westminster, B.C.

Plant, cost $35,000, Queensborough, for The Heaps Engineering Co., 445 Hastings street west, Vancouver. Machinery required. Plans prepared.

Ottawa, Ont.

Storehouse, cost $16,000, Laurier, for City of Ottawa Electric Dept. Architect, Supt. Brown, City Hall. Three storeys, cement foundation, reinforced concrete construction, concrete floors. Plans in progress.

Extension to bakery for B. Slinn & Co., Ltd., 177 Creighton. Tenders received by owner. Extensions include new bread making ovens, stables for horses and wagons. Cement foundation, solid brick construction.

Preston, Ont.

Two warehouses for The Preston Car & Coach Co., Ltd. 200 x 120, concrete foundation, wood frame, sheet metal, bow string truss roof, covered with tar and gravel roofing. Plans in progress.

Stratford, Ont.

Factory, cost $15,000, for B. F. Rastner Co. Four storeys. Plans will be prepared.

St. John, N.B.

Remodelling bank and office building, Prince William and Church streets, for Merchants Bank of Canada. Manager, J. F. Shreve, 58 Prince William street. Architect, F. Neil Brodie, 42 Princess streets, is preparing plans. Tenders to be called next week.

Springfield, Ont.

Business block, cost $12,000, Main St., for H. Johnson. Two storeys, 50 x 55, stone and cement foundation, white and pressed brick construction. Plans in progress.

Toronto, Ont.

Iron fence, cost $25,000, Withrow Park, contemplated by the city. Mayor, H. C. Hocken. Park commissioner, J. C. Chambers, City Hall.

Factory, cost $40,000, for A. T. Reid & Co., Ltd., 266-274 King street west. Stone foundation, brick construction. Plans ready.

Vancouver, B.C.

Stores and Apartments, cost $70,000, Carroll street and Market Alley, for Wing Sang & Co., 13 Seventeenth Ave. east. Eight storeys, brick construction. Tenders called. Plans, specifications, at office of Architect, who also receives separate tenders. Former tenders were rejected.

Walkerton, Ont.

Sash and door factory, cost $7,000, for E. Truax & Son. One storey, 150 x 90, cement foundation, white brick construction, felt and gravel or patent roofing. Plans in progress.

Welland, Ont.

Factory [illegible] Company to manufacture duck fabric used in the making of automobile tires, to be in operation by October, 1914. Two storeys, [illegible] x 100, brick and stone construction.

Winnipeg, Man.

D. James, 249 Notre Dame Avenue, has applied for permit to erect public garage 49 ft. 6 in. x 132 on east side Furby street, between Sargent and Notre Dame Ave.

J. D. Ormsby & Co., 677 Notre Dame ave., have applied for permit to erect corrugated iron storage shed 11 x 117 at above address.

Business building for the Birt Printing Co., 386 Colony street on the corner of McDermot and Margaretta street. Plans will be pre ared.

Storage warehouse and garage, cost $5,000, for Gaults Ltd., Bannatyne and King streets. Architect, D. W. Bellhouse, 703 Canada Bldg. Four storeys and basement, 59 x 111, garage, 30 x 60, concrete foundation, Tyndall stone and structural iron construction. B. C. fir floors, felt and gravel roofing, sheet metal, electric lighting, steam heating, two freight elevators, office fixtures, vaults, fire escapes, screens, boilers, gasoline storage system. Tenders will be received by architect.

CONTRACTS AWARDED

Hamilton, Ont.

Addition to factory, cost $14,000, for Laidlaw Bale Tie Co., 4 Adams street. Builder & general contractor, Geo. E. Mills, 614 King street east. Carpenter, Geo. White, 165 Main street east. Roofing, J. E. Riddell & Son, Ferguson ave. N. Painting, E. B. Turnbull, King St. E. 2½ storeys, 100 x 80.

Hamilton, Ont.

Remodelling stores and apartments, cost $20,000, 471-9 King street east, for A. Williamson and J. F. Torrance, Spectator Bldg. Architect, H. H. New, Spectator Bldg. Mason, Wm. Inrig, 140 Flatt ave. Carpenter, R. W. Miller, 169 Rebecca street. Painting and glazing, Geo. Smith, 219 Ferguson ave. S. Roofing, J. E. Riddell, 12 Ferguson ave. N. Plumbing and heating not yet let. Iron work, D. McIlroy, Lottridge street. 3-storeys, 144 x 50.

Addition to factory, cost $40,000, for Canada Steel Goods Co., Arthur street. Architects and general contractors, Stewart & Witton, 2 Hughson street S. Roofing, John E. Riddell & Son, King St. E.

Warehouse and factory, cost $18,000, Mary street, for Robertson Bros., 12 Mary street. Manager, D. Fleming. Architect, D. J. Corrigan, 231 Catharine St. N. General contractor and builder, Alex Milne, 67 Mary street.

Factory, cost $5,000, Cumberland ave., for Furnell-New Ltd., Spectator Bldg. Architect, H. H. New, Spectator Bldg. General contractor, Wm. Inrig, 140 Flatt ave. Carpentry, Halliday Bros., 209 Main street east. Painting and glazing, Stamp & Son, King William and Walnut streets. Roofing, J. E. Riddell, King street east.

Addition to factory, cost $40,000, for Otis Fensom Elevator Co., Victoria ave. N. Architects, Stewart & Witton, 2 Hughson street S. Steel work, Hamilton Bridge Works Co., Barton and Bay streets. Carpenter, D. N. Campbell, Robinson street. Foundations in.

Factory, cost $35,000, [illegible] Steel Co. of Canada, Ltd., Sherman ave. N. Architects, Prack & Perrine, 36 James street S. General contractors, H.

[illegible] & Co., Main & Hughson streets. Excavation started.

Alterations to store and apartments, cost [illegible], Hughson street, for James H. Stewart, 14 John St. N. Architect, [illegible] McPhie, Bank of Hamilton Bldg. General contractor, H. C. Malcolmson, 41 Queen street north. Masonry, Geo. E. Mills, 614 King street E. Painting and glazing, Dodson & Co., [illegible] Victoria ave. N. Electric wiring, Electric Supply Co., 65 James St. S.

London, Ont.

Warehouse, cost $8,500, for Ross Ltd., 196 Dundas street. Architect, W. G. Murray, 111 Masonic Temple. General contractor, John Moran, 557 Dundas St. Two storeys, 93 x 19 ft. 6 in., white brick construction, brick foundation, maple floors, felt and gravel roofing.

Montreal, Que.

Warehouse and office building, cost $200,000, St. Antoine and St. Cecile Sts., for Canadian Fairbanks-Morse Co., 444 St. James street. Architect, T. Pringle & Son, 419 Coristine Bldg. General contractor, E. G. M. Cape, Beardmore Bldg. Sub-tenders received by general contractor.

Alterations to warehouse and offices, cost $15,000, for Christie Brown Co., Ltd., Duke street, Toronto. Architect, J. W. McGregor, 515 Roslyn avenue. General contractor, Daniel Kneen, 110 Mance. Two storey addition, 86 x 59, solid brick, cement foundation, felt and gravel roofing.

Point Grey, B.C.

Garage for W. A. Maner. Architects, Somervell & Putman, 744 Hastings St. W., Vancouver. General contractor, Mr. Averson, 198 Hastings street west, Vancouver. Brick and frame construction.

Preston, Ont.

Factory for Anchor Mfg. Co., Ltd., 93 Niagara street, Toronto. Builder, Jas. Eagle, Preston. Construction room, foundations in, one storey, 180 x 90, machine shop, walls partly up, 1 storey, 100 x 50, felt and gravel roofing, galvanized iron cornice.

Construction shop, cost $6,000, for Preston Car & Coach Co., Ltd., Preston. General contractor and builder, James Eagle. One storey, 60 x 200, frame, covered with sheet metal, cement foundation, felt and gravel roofing. Excavating started.

Sherbrooke, Que.

Stores and offices, cost $70,000, Wellington street, for Quebec Central Railway, Dufferin ave. Architects, Cox & Amos, 112 Mansfield street. General contractors, D. G. Loomis & Sons, St. Gabriel street. Four storeys, 50 x 70.

Sarnia, Ont.

Extension to stove factory for Doherty Mfg. Co., 157 Vidal street south. Manager, W. Doherty. Architect, R. W. Fawcett, 152 Essex street. General contractor, Thos. Grace, 170 Stuart street. Three storeys, 100 x 40, stone foundation, white brick construction.

Toronto, Ont.

Bank building, College and Bathurst street, for Metropolitan Bank. Architects, Darling & Pearson, 2 Leader Lane. Marble, Lautz Co., 145 Church street. Masonry, H. N. Dancy & Son, 220 Howland ave. Carpentry, J. C. Scott Co., Ltd., 106 River street. Roofing, G. Duthie & Sons, Ltd., 30 Widmer street. Painting, Chas. W. Landon, 569 College street. Heating and plumbing, Purdy Mansell, Ltd., 63 Albert street. Electrical work, McDonald & Willson, 12 Queen street east. Plastering, Routery Bros., 443 Roxton road. Terra cotta, Federal Terra Cotta Co., New York.

Three attached stores, cost $10,000, Gerrard street. Owner and builder, W. H. Gurst, 599 Wilton ave. Brick construction, stone foundation.

Work shop, cost $4,000, Bathurst St. Owner and builder, M. A. Croft, 486 Clinton street. Stone foundation, brick construction, felt and gravel roofing, 1-storey.

Vancouver, B.C.

Dairy building, cost $70,000, Eighth ave. and Hemlock street, for The Standard Dairy Co. Architects, Braunton & Leibert, Exchange Bldg. General contractors, J. J. Dissette & Co., 570 Granville street. Four storeys, 80 x 100, reinforced concrete construction, ice-making machinery and office furniture required.

Victoria, B.C.

Mill, cost $7,000, Hereward Rd., for The Redwing Lumber & Supply Co., Ltd., 850 View street. General contractor, G. E. Hutchinson.

Winnipeg, Man.

Store and office, cost $3,500. Architect and builder, A. C. MacDonald, 644 Sargent ave. Brick foundation, brick construction. Two storeys, 22 x 36. Excavation started.

Improvements to hotel, cost $20,000, Smith street. Lee & McCarrey, Props. Carpentry, The Sprague Lumber Company, 47 Higgins ave. Painting, Hector L. Chalmers, 167 Arlington street. Flooring, Hooper's Marble & Granite Company, 255 Main street. Owners will take in two stores adjoining their property and remodel into cafe.

Hotel, cost $100,000, Notre Dame & Albert street, for Geo. Skinner, Prop. Grange Hotel, 168 Lombard street. Architects and general contractors, Carter, Halls, Aldinger & Co., Union Bank Bldg. Three storeys and basement, mezzanine dining room, large basement grill room, 75 bedrooms, ice plant. To be called St. Charles Hotel. Excavation started.

Residences

London, Ont.

Residence, cost $4,200, Duchess ave., for Harry Lester, Druggist, Worthy Road. Architect, W. G. Murray, Dominion Savings Building. Two storeys, 30 x 45, white and pressed brick construction, stone and cement foundation. Plans in progress.

Residence, cost $6,000, St. James, for John Hall, 592 Talbot street. Architect, W. G. Murray, 111 Masonic Temple. 2-storeys, 35 x 48, white pressed brick construction. Plans in progress.

Bungalow, cost $4,200, for Walter Langridge, Marley Place. Architect, W. G. Murray, 111 Masonic Temple. 1½ storeys, 30 x 40, frame construction, stone and cement foundation. Plans in progress.

Montreal, Que.

Residence, cost $50,000, for Napoleon Herbert, 684 Pac La Fontaine. Tenders received by Theo. Daoust, architect, 90 St. James street, after March 1st. Three storeys, 50 x 110, pressed brick, cut stone construction, tile.

Residence, cost $8,000, St. Laurent, for E. C. Crevier, Apartment 3, 2150 Park ave. Tenders received by architect, Rene Charbonneau, 15 St. James street, Montreal, after Feb. 15th. Two storeys, 35 x 35, cement foundation, vressed brick construction.

Ottawa, Ont.

Two residences, cost $10,000, Hopewell street, for Samuel J. Lucy, 40 Glenn ave. Stone foundation, brick veneer construction. Plans in progress.

Residence, cost $6,000, Driveway, for W. H. Walker, 482 Cooper street. Stone foundation, brick veneer construction. Plans in progress.

Three residences, cost $9,000, for N. D. Porter, Bank street. Stone foundation, brick veneer construction. Plans in progress.

Ridgetown, Ont.

Residence, cost $4,500, for Mr. J. E. Milton. 2½ storeys and basement, 35 x 40. Plans in progress.

Manse, cost $6,000, for Mt. Zion Presbyterian Church. Pastor, Rev. G. M. Dunn. Architect not yet chosen. Chairman Building Committee, Angus Gillander. Two storeys, 30 x 45, stone and cement foundation, white and pressed brick construction. Plans will be prepared.

Toronto, Ont.

Twenty-one pairs of residences, cost $105,000, Grace Terrace, for R. C. Bustard, 146 Confederation Life Bldg. Brick foundation and construction. Plans drawn.

Pair residences, cost $4,500, E.S. Pacific ave., for W. J. R. Fowler, 119 Howard Park ave. Architect, S. Smith, 30 Shannon street. Brick foundation, brick construction. Plans drawn.

Residence, cost $11,000, for W. H. Irvine, Royal Bank Bldg. Architects, Eden Smith & Son, 199 Yonge street. Masonry, Thomas Bros., 60 Dupont St. Other trades not yet let. Brick foundation, cut stone and brick construction.

Residence, Warren Road and Lonsdale ave., for A. A. Morrice. Architects, Eden Smith & Sons, 199 Yonge street. Masonry, Thomas Bros., 60 Dupont St. Other trades not yet let. Brick foundation, brick construction.

Residence, cost $3,500, cor. Marmaduke and Indian road, for Dr. G. L. Palmer, 162 Indian road. Two storeys, brick construction and foundation. Plans drawn.

Residence, cost $4,200, Melgund Rd., for J. H. Staines, 581 Dovercourt Road. Architect, J. H. Stanford, Bloor & Ossington ave., has prepared plans. Stone foundation, brick construction.

Wainwright, Alta.

Twenty residences, cost $45,000, for The South Wainwright Realty Company, Confederation Life Bldg. Architect, J. Pender West, Somerset Bldg., Winnipeg, Man. Two storeys, cement foundation, frame construction. Plans in progress.

Tenders and For Sale Department

Tenders for Dredging

Sealed tenders, addressed to the undersigned, and endorsed "Tenders for Dredging, Port Burwell, Ont.," will be received until 4 p.m. on **Monday, March 3, 1913**, for dredging required at Port Burwell, Ont.

Tenders will not be considered unless made on the forms supplied, and signed with the actual signatures of the tenderers.

Combined specification and form of tender can be obtained on application to the Secretary, Department of Public Works, Ottawa. Tenders must include the towing of the plant to and from the work. Dredges and tugs not owned and registered in Canada shall not be employed in the performance of the work contracted for.

Contractors must be ready to begin work immediately on the opening of navigation.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, for five per cent. (5 p.c.) of the contract price, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,
R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, February 10, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department. 35607 7 8

Town of Bowmanville
Province of Ontario

Notice to Contractors

[illegible]
[illegible]

Wednesday, March 19th, 1913,

for the several works in connection with a Water Works System and a Sewerage System for the Town:—

Contract A (1) [illegible]
Contract A (2) [illegible]
Contract B.—Constructing Pump House.
Contract C [illegible]
Contract D. Furnishing Iron Pipes.
Contract E.—Furnishing Hydrants, Valves, Etc.
Contract G.—Furnishing Electrically Operated [illegible]
Contract M [illegible] eight miles in length.
Contract S. Furnishing Sewer Pipes.
Contract [illegible] Works.

Plans and specifications may be seen at the office of the Engineers, Toronto, on and after [illegible]

S. C. HILLIER, Esq., M.D., Mayor.
JOHN LYLE, Esq., Town Clerk.
CHIPMAN & POWER, [illegible]
89 Mail Bldg., Toronto, Ont

Tenders Wanted

Sealed tenders registered and endorsed on the envelope. Tender for (Tender bidding on) and addressed to Sydney Appleby, Esq., Secretary-Treasurer of the Town of Sutherland, Sask., will be received up to 6 p.m. **February 24th, 1913**, for the supply and delivery of the following materials and the performance of certain works:—

Tender "A"
For the supply and delivery of approximately 8,650 feet of 12-inch steel pipe and specials.

Tender "B"
For the supply and delivery of approximately 9,775 feet of 10-in. steel pipe or cast iron pipe.
Approximately 4,000 feet of 8-in. steel pipe or cast iron pipe.
Approximately 18,800 feet of 6-in. steel pipe or cast iron pipe and specials.

Tender "C"
For the supply and erection of Stand pipe.

Tender "D"
For the erection of sewage disposal works.

Tender "E"
Trenching and laying 8,650 feet of steel water pipe for supply main, setting valves, etc., and back filling.

Tender "F"
Trenching and laying of approximately 9,775 feet of 10-in. steel pipe or cast iron pipe.
4,000 ft. of 8-in. steel pipe or cast iron pipe.
18,800 ft. of 6-in. steel pipe or cast iron pipe.
Setting valves, hydrants, etc., and back filling.

Tender "G"
Supply and delivery of—
3,420 ft. of 20-in. vitrified sewer pipe.
8,030 ft. of 18-in. vitrified sewer pipe.
2,200 ft. of 15-in. vitrified sewer pipe.
Excavating and laying and construction of man holes, etc.

Tender "H"
The supply and delivery of—
3,766 ft. of 12-in. vitrified sewer pipe.
5,650 ft. of 10-in. vitrified sewer pipe.
5,080 ft. of 8-in. vitrified sewer pipe.
Excavating and laying and construction of manholes, etc.

Tender "I"
For the construction of approximately—
62,000 square feet of concrete sidewalks.
1,670 lineal feet of curb.

Tender "J"
Approximately two and one-half miles of street grading.

Tender K
For the supply and delivery of 30 Fire Hydrants, 52 Gate Valves, 1 Automatic Air Relief Valve.

A marked cheque for five per cent. of the amount of the tender must accompany each bid

The lowest or any tender not necessarily accepted.

For the supplying of materials and all trenching the tender forms must be filled in, these are obtainable at the Consulting Engineers' offices.

[illegible] offices of the Consulting Engineers, Saskatoon, Sask.

[illegible]

Or a complete set of plans and specifications [illegible]

[illegible] closing tenders.

SIDNEY APPLEBY, [illegible]

Messrs. Murphy & Underwood,
Consulting Engineers,
[illegible]

Tenders for Power House Equipment

Sealed tenders registered, and clearly marked on the outside of the envelope, "Tenders for Power-House Equipment," and addressed to the City Commissioners at Regina, Sask., Canada, will be received up until noon of **March 15th, 1913**, for the supply of:—

Boilers

6 [illegible] mechanical stokers and internal superheaters for 200 lbs. pressure and 125 degrees Fah [illegible]

Fans and Stack

2 One hundred and thirty-three thousand cubic feet per minute ¾ or ⅞ housings, induced draught fans arranged to discharge through one vertical stack 12 feet in diameter, and 70 feet high from base of fans.

Price to be on equipment erected on foundation built by the City of Regina to contractors' [illegible]

Copies of specifications may be had from E. W. Bull, Supt. of Light and Power, Regina, Sask.

A marked cheque for five per cent. of amount [illegible] City of Regina, must accompany each tender.

The City Commissioners reserve the right to [illegible]

[illegible]

Town of Swift Current, Sask.

Tenders for

Cast Iron Pipe and Specials

or

Alternatively Steel Pipe and Specials

[illegible] rent are prepared to receive tenders for the supply of the following material:

Cast Iron or Steel	Tons C.I.	Lin. Feet.
[illegible]	131	[illegible]
[illegible]	[illegible]	[illegible]
10-in. diam	160	5346
[illegible]	210	[illegible]
Totals	[illegible]	[illegible]

[illegible]

[illegible] on application to the undersigned.

[illegible] March, 1913

[illegible]

Swift Current, Sask.,
[illegible]

TOWN OF SARNIA
Province of Ontario

Tenders for Water Works

[illegible] marked [illegible] A," [illegible] and ad[illegible] the Town Clerk, Sarnia, Ont., will [illegible] up to 8 p.m., Saturday, March 15th, 1913 [illegible] con[illegible]

[illegible] force main, and furnishing certain materials [illegible]

Contract B. Furnishing all materials for and [illegible]

[illegible] for and [illegible] Spillway.

Contract D. Furnishing Cast Iron or Steel Water Pipes [illegible]

[illegible] Valves, Flexible Joints, Expansion Joints, etc.

Contract F. Furnishing material for and constructing timber wharf or dock.

[illegible] Pumping Machinery and accessories.

Contract H. Furnishing and erecting Boilers and accessories.

Copies of plans, profiles, specifications, instructions to bidders, etc., may be seen at the office of H. A. McLean, Town Engineer, Sarnia, or at the office of Chipman & Power, Toronto, on and after February 1st, 1913.

Persons tendering are notified that tenders will not be considered unless made on forms supplied. Forms will be mailed upon request to the En[illegible]

Dr. J. A. BELL, Mayor.
Dr. W. A. HENDERSON,
Chairman Fire and Water Committee.
Sarnia, Ont., Jan. 29, 1913. 6-9

Province of New Brunswick

Department of Public Works

Notice to Contractors

Sealed Tenders Marked

Tender for the construction of the substructure and approaches of Newcastle Bridge will be received at the Department of Public Works, Fredericton, until **Wednesday, 26th day of February, 1913**, at noon, for building the substructure and approaches of a new bridge on a new site at Newcastle, N.B., over the Miramichi River, between the Parishes of Newcastle and Glenelg, Northumberland Co., N.B., according to plans and specifications to be seen at the Public Works Department, Fredericton, N.B., at the office of Hon. John Morrissy, Chief Commissioner of Public Works, Newcastle, Northumberland County, N.B., at the Provincial Government Rooms, St. John, N.B., and at the Chief Draughtsman's Office of the Public Works Department, City Hall, Montreal, P.Q.

Tenders must be submitted on the Department's standard tender forms, supplied for the purpose. They shall be signed with the tenderer's actual signature, stating occupation and place of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the [illegible]

Each tender must be accompanied by a certified bank cheque or cash for an amount equal to five per cent. of the tender, which will be forfeited if the party tendering declines to enter into contract when called upon. Such certified bank cheque or cash will be returned to the parties whose tenders are not accepted, but with the party to whom the contract is awarded, it shall be retained until the final completion of the contract and its acceptance by the Department.

All tenders must be enclosed in sealed envelopes, endorsed as above, and no tender will be considered which does not adhere strictly to the requirements prescribed herein.

The Department does not bind itself to accept the lowest or any tender.

JOHN MORRISSY,
Chief Commissioner.
Department of Public Works,
Fredericton, N.B., Jan. 30, 1913. 6-8

Regina Public School Board

Tenders, sealed and endorsed on envelope "Tenders for School Building, Block 56, Belvedere, Regina," will be received by the undersigned up to 12 o'clock noon, **March 5th, 1913**, for work and material in all trades (except plumbing, heating and ventilating) required in the erection and completion of a Public School Building.

Each tender must be accompanied by a marked cheque for five (5) per cent. of the amount of the tender, made payable to the Chairman of the Public School Board; the successful tenderer to have this cheque returned upon furnishing satisfactory bond for ten per cent. of the amount of the contract, conditional for the due and proper performance of the work. The deposit of the unsuccessful tenderers will be returned when the contract is signed.

The right to reject any or all tenders or to waive any defects or irregularities therein, is to be at the discretion of the Board.

Plans, specifications, form of tender and all information may be obtained on application to the undersigned.

J. H. PUNTIN, Architect,
8-9 308 Darke Bldg., Regina, Sask.

City of Calgary

Tenders for Asphalt Paving Plant

Sealed tenders, addressed to the City Commissioners, City Hall, Calgary, Canada, will be received at the office of the undersigned up to five o'clock p.m. on **Saturday the 1st day of March, 1913**, for the necessary materials (exclusive of crushers) required for the equipping of an Asphalt Paving Plant for the City of Calgary.

The whole cost of the plant, when complete, not to exceed the sum of $60,000.

Specifications of materials required and full information will be gladly furnished on application to the City Commissioners.

J. M. MILLER, City Clerk.
Calgary, Alta., Feb. 5, 1913. 7-8

Town of Swift Current, Sask.

Tenders for

Gate Valves, Valve Boxes, and Fire Hydrants

The Town Council of the Town of Swift Current are prepared to receive tenders for the supply of the following material:—

37—6-in. Valves and Boxes, 3—8-in. do, 3—10-in. do, 3—12-in. do.

22—6-in. Fire Hydrants.

Specifications and forms of tender may be had on application to the undersigned.

Tenders endorsed "Valves and Hydrants," to be lodged with the Secretary-Treasurer not later than noon of **Monday the 17th of March, 1913**,

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

CONCRETE BRIDGES

Sealed tenders will be received until **March 1st** by Wm. Purves, Esq., Township Clerk, Columbus, Ont., for the building of four reinforced concrete bridges in the Township of East Whitby.

For plans and specifications apply to the undersigned.

H. GIFFORD, Esq., Reeve,
Cedarvale, Ont.
BOWMAN & CONNOR, Civil Engineers,
8-9 36 Toronto Street, Toronto, Ont.

CITY OF CALGARY

Tenders for Vacuum Street Cleaner

Sealed tenders addressed to the City Commissioners, and marked "Tender for Vacuum Street Cleaner," will be received at the office of the undersigned up to 5 p.m. on **Friday, March 7th, 1913**, for the supply of one Vacuum Street Cleaning Machine for the City of Calgary.

For further particulars as to requirements, specifications, etc., of the machine, communicate with Mr. W. H. Cuddie, Supt. of Street Cleaning, Calgary, Canada.

Any or all tenders not necessarily accepted.

9 J. M. MILLER, City Clerk.

County of Haldimand

Road Superintendent

Applications will be received up to and including the **8th of March** for the position of Road Superintendent for the above County. Schedule of the duties may be had on application to the County Clerk, Cayuga.

Applications must be in the handwriting of the applicant, must be sealed and endorsed on the outside "Application" and be addressed to the undersigned.

Applicants should state clearly their experience on road work, their age, whether teetotal or moderate, when ready to assume position, and salary expected, which shall include travelling expenses.

Not more than three names should be given of persons acquainted with the applicant to whom Committee may apply for information.

WILLIAM WALTON,
Chairman County Roads Committee,
8-10 Cayuga, Ont.

Tenders for Hardware

Tenders for hardware for the following buildings will be received by registered post only, addressed to the undersigned, up to noon on **Tuesday, March 4, 1913**:—

1. Bath House, Sackville street.
2. Police Station, Markham street.

Plans and specifications may be seen and forms of tender and all information obtained at the office of the City Architect, City Hall, Toronto. Envelopes containing tenders must be plainly marked on the outside as to contents. The usual conditions relating to tendering, as prescribed by city by-laws, must be strictly complied with, or tenders may not be entertained. Tenderers shall submit with their tenders the names of two personal sureties or the bond of a guarantee company. The lowest or any tender not necessarily accepted.

H. C. HOCKEN, Mayor,
Chairman Board of Control.
City Hall, Toronto, Feb. 17, 1913. 8

Tenders for

Concrete Abutments

Sealed tenders, plainly [illegible] will be received up to noon of **Monday, March 3rd, 1913,** for the construction of Concrete Abutments for a Bridge on Old Yonge street in Lot 10, Con. 1 East, Township of York.

Plans and specifications may be obtained at the office of the undersigned.

The lowest or any tender not necessarily accepted.

FRANK BARBER, [illegible]
57 Adelaide Street East.
Toronto, Ont.
February 18th, 1913. 8

Town of Swift Current, Sask.

Tender for

Sinking Gas Well

The Town Council of the Town of Swift Current are prepared to receive tenders for the sinking of a Gas Well approximately 2,000 feet in depth.

Specifications and forms of tender may be had on application to the undersigned.

A deposit of Ten Dollars ($10) will be required for each copy of the specifications, which will be returned on receipt of a bona fide tender.

Tenders endorsed "Gas Well" and accompanied by a marked cheque for $2,000 to be lodged with the Secretary-Treasurer not later than noon of **Monday, the 17th of March, 1913.**

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

Sealed tenders addressed to the undersigned, and endorsed "Tender for Armoury, Port Arthur, Ont.," will be received at this office until 4 p.m. on **Tuesday, March 4, 1913,** for the construction of the building mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of the City Clerk at Port Arthur, Ont.; at the office of H. E. Matthews, Esq., Superintending Architect of the Dominion Public Buildings, Winnipeg, Man., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. [illegible]
Secretary
Department of Public Works,
Ottawa, February 17, 1913

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—36279. 8-9

Notice to Contractors

Tenders for Sewers

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on Tuesday, **March 4th, 1913,** for the construction of sewers on the following streets:—

Main street, Kingston Road to Gerrard street; Gerrard street, Morton Road to Wayland ave.

Specifications and tender forms may be obtained upon application at the office of the Sewer Branch, Department of Works, City Hall, Toronto.

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as prescribed by city by-law must be strictly complied with or the tenders will be declared informal.

Tenderers shall submit with their tenders the names of two personal sureties approved of by the City Treasurer, or in lieu thereof, the bond of a Guarantee Company, approved of as afore[illegible]

The lowest or any tender not necessarily [illegible]

H. C. HOCKEN, Mayor,
Chairman, Board of Control.
City Hall, Toronto,
February 6th, 1913. 8

Canadian Pacific Railway Co.

Department of Natural Resources

Tenders for

Concrete Paving

Sealed tenders addressed to the undersigned and endorsed "Tender for Concrete Paving," will be received up to noon of **March 29th, 1913.** The work to be let is the construction of a Concrete Paving on the Dams of Lake Newell Reservoir, and amounts to about 11,200 cubic yards of concrete paving and 8,700 cubic yards of gravel base. Construction materials, except forms, and water for concrete, will be supplied by the company. All labor, plant, and materials for forms must be furnished by the contractor.

Plans and specifications and all information may be obtained on application to the undersigned. A deposit of $25 will be required as a guarantee of good faith before plans, etc., will [illegible] ceipt of a bona fide tender.

All [illegible] $5,000 which will be forfeited as liquidated damages should the bidder refuse or neglect to execute the contract to construct the work if awarded to him. Proposals must be made in the form pro[illegible]

[illegible]

A. S. DAWSON, Chief Engineer.
[illegible] 1913. 8-10

City of Moose Jaw, Sask.

Tenders for

Line Material.

Sealed tenders marked "Tenders for Line Supplies," and addressed to the City Commissioners, Moose Jaw, Sask., will be received up to 12 o'clock noon, **Wednesday, March 5th, 1913,** for the following:—

1. Copper and Iron Wire.
2. Cedar Poles.
3. Fir Cross Arms.
4. Pole Line Hardware.
5. Miscellaneous Line Supplies.

Each tender must be accompanied by an accepted cheque or cash deposit equal to at least five per cent. of the total amount of tender.

Specifications and full information may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw, Sask.

The lowest or any tender not necessarily accepted.

JAMES PASCOE,
L. W. RUNDLETT,
W. F. HEAL, City Commissioners.
Moose Jaw, February 12th, 1913. 8-9

Wanted At Once

No. 5 Austin Stone Crusher with Elevator and Screen. Single drum hoist with or without boiler.

7 [illegible]

Five or 6 yard dump cars, standard gauge preferred.

T. P. Altimas, 340 Sparks Street, Ottawa, [illegible] 8

For Sale

Owner leaving country has for disposal at the low price quoted and in perfect condition,

One Transit, complete	$95.00
One 15 in. level, tripod and levellyion ...	65.00

Cases and equipment included.

Reply to Box 712, Contract Record, Toronto, Ont. 8-9

Messrs. Royce Limited, Electrical & Mechanical Engineers, Trafford Park, Manchester, Eng., wish to communicate with a firm of Constructional Engineers in Canada who wrote them during 1912 offering their services as Agents, and will be obliged if the firm in question will respond to this advertisement. 6-8

Situations Wanted

[illegible] company in West Indies or Mexico. Two years [illegible] 8-11

Situations Vacant

W[illegible] draughtsmen. Reply stating experience and salary [illegible]

[illegible]
8 Hamilton, Ont

[illegible] City Engineer, Architect and Manager of the Belleville Water Works, applications to fill va[illegible] ary 24th, 1913, [illegible]

W. H. PANTER,
Chairman Executive Committee,
[illegible]

Special Notice to Contractors

[illegible] any quantity of

Relaying Rails or for Reinforcing Concrete

[illegible] Sewage Lot & [illegible] Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

---

200 Acres of Rock

[illegible] Easily worked [illegible], forty miles from Toronto. Splendid proposition for a com[illegible] Rubble [illegible] Williams, [illegible] Annette Street, Toronto, Ont. 7-8

McMyler Derricks For Sale

[illegible] buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover buckets, two (2) marine engines, boilers, fuel [illegible] Address

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

Residences

(Continued from page 74)

Waterloo, Ont.

[illegible] $6,500, King street, for A. G. Sanderson. Architects, Reid [illegible] x 38. Plans in progress.

Winnipeg, Man.

Apartment block, Lipton street. Architect, D. Abramovitch, 416 Main St., is preparing plans. Three storeys, 50 x 80. Tenders will be called in about [illegible].

CONTRACTS AWARDED

Halifax, N.S.

Residence, cost $6,000, Jubilee Road, for Capt. Jas. W. Harrison, 14 North Bland street. Builders, Maxner & Dunlop, 152 Windsor street.

Hamilton, Ont.

Residence, cost $4,000, Blake street, for A. J. Taylor, 130 Markland street. Builder, R. G. Wilson, 4 Rutherford. 2½ storeys, brick and cut stone construction, stone foundation.

Seven residences, cost $12,000, Somerset ave. General contractors and builders, McNaught & Bethune, 495 Wilson street. Brick construction, stone foundation.

Residence, cost $4,000, Undermount ave., for A. J. Taylor, 130 Markland St. Builder and general contractor, R. G. Wilson, 4 Rutherford ave. 2½ storeys, stone foundation, cut stone and pressed brick construction.

Kingsville, Ont.

Residence, cost $4,000. Owner and builder, Joseph Jackson. Two storeys, 28 x 40, white brick construction, stone and cement foundation.

Montreal, Que.

Two residences, cost $20,000, Westmount Boulevard ave., for Thomas Lamb, 573 Argyle ave. Architects, Nobbs & Hyde, 49 Beaver Hall Hill, Montreal. General contractor, John Allan, 300 Atwater. Three storeys, 72 ft. 8 in. x 31 ft. 11 in., cement foundation, cut stone and brick construction, maple, tile and oak floors, felt and gravel roofing. Sub tenders received by general contractor.

Seven residences, Westmount (Victoria ave.). General contractors, Montreal House Construction Co., Dominion Express Bldg., Montreal. Architect, J. Wechselberger, 30 St. John street, Montreal. Two storeys, 150 x 48, cement foundation, cut stone and pressed brick construction. Sub tenders received by architect.

Six flats, cost $4,500, for Alphonse Souci, 1822 Henri Julien street. Architect and general contractor, Joseph Vailleucourt, 43 Laurier ave. west. Three storeys, 32 x 44, cement foundation, brick construction, felt and gravel roofing.

Two residences, cost $4,000, St. Denis. Builder and general contractor, A. Filion Frere, 865 St. Valier. Two storeys, 28 x 65, brick construction, cement foundation, felt and gravel roofing.

One pair residences, cost $5,000, W.S. Hastings ave. Owner and builder, H. E. Hunt, 33 Wesley street. Two stys., stone foundation, brick construction.

One detached residence, cost $9,500, High Park and High Park Gardens, for W. S. Walker, 545 Palmerston Blvd. Builder, Thos. F. Robertson, 438 Delaware ave. Cut stone and brick construction, stone foundation.

Residence, cost $3,500, for Glebe Manor Estate, 57 Victoria street. Builder, A. Webb, 13 Shirley street. Stone foundation, brick construction.

Vancouver, B.C.

Residence, cost $7,000, for E. J. Mollou, general contractor. Architects, Donnellan & Robertson, 319 Pender St. Brick and stone construction. To be erected at 965 2nd ave.

Valmorin, Que.

Residence, cost $15,000, for Mr. J. P. B. Casgrain, 180 St. James street, Montreal. Architects, Wadsworth & Henderson, Room 622 New Birks Bldg., Montreal. General contractor, J. R. Flyn, 13 Philips Sq. Sub tenders received by general contractor. Two storeys, 36 x 70, stone foundation, stone and wood construction.

Walkerville, Ont.

Residence, cost $7,000, Sandwich St., for Peter Fox, Leamington, Ont. Builder and general contractor, Cyrus Gardner, Walkerville. Cement foundation, pressed brick construction. Two stys., 40 x 45.

Winnipeg, Man.

Residence, cost $4,200, Elgin avenue, for Trustees, Sparling Methodist Church. Architects, Jas. Chisholm & Son, Enderton Block. General contractors, Addison & Morgan, c/o architects. Two storeys, 29 x 36, frame, stone foundation.

Residence, cost $4,000, Wolseley ave. Architect and general contractor, J. G. McArthur, 316 Colony street. Two stys., 28 x 40, frame, stone foundation. Excavation started.

Power Plants, Electricity and Telephones

Fort William, Ont.

A. C. Stewart & Co. have been awarded contract for new Chamber of Commerce to be completed by end of Sept. Estimated cost $280,000. Work will start immediately.

Glencoe, Ont.

Village Council contemplate installing hydro-electric system. Reeve, J. N. Currie.

London, Ont.

City Council L. H. & Power Commission contemplate purchasing a gas tank. Mayor, C. M. R. Graham.

Ottawa, Ont.

Equipment and extension to station, cost $22,000, Laurier ave. west, in connection with extension of lighting system, contemplated by City Council, Electrical Dept. Mayor, J. A. Ellis. Engineer, Supt. Brown, City Hall.

Extension to street lighting, cost $7,342, is planned by City Council, Electrical Dept. The matter has been passed by the Board and will now go ahead. Mayor, J. A. Ellis. Engineer, Superintendent Brown, City Hall.

Stratford, Ont.

Extension to electric lighting system planned by City Council. Mayor, C. N. Greenwood. Chairman Light and Heat Commission, Ald. Angus McDonald. Equipment required.

Winnipeg, Man.

Extension to sub-station, cost $12,747, planned by Board of Control. Secretary M. Peterson. Engineer, J. G. Glassco, 54 King street. General contractors, Head, Shannon & Head, 410 McArthur Bldg. Extension to McPhillips street power sub-station to provide for extension of street lighting system.

J. HARVEY
CONTRACTOR
Greensville - - Ont.

Driller of Oil, Gas, Salt or Artesian Wells
Deep Wells a Specialty
20 Years' Experience in Canadian Oil Field

Contracts taken in any part of Canada. Several years' experience in Artesian Wells for Municipal Water Works. Estimates or geological information cheerfully furnished. **References Given.**

TURBINE PUMPS

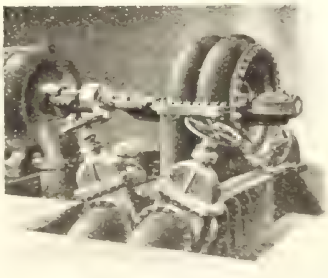
for Water Works Purposes

In Water Works practice it is necessary to provide for two pressures, one domestic and the other higher for fire service. For this purpose we offer our

Patented Double Suction

By an ingenious application of the double suction it is practicable to operate the same pump at either fire or domestic pressure and yet maintain a constant speed. The recent addition to the waterworks at Lachine shows how this end is attained.

The unit consists of a 14-inch 2-stage turbine pump of capacity of 5,000,000 Imperial gallons per 24 hours driven by either a 400 horse power motor or a 400 horse power steam turbine at 1,200 r.p.m. For ordinary domestic purposes a pressure of 80 lbs. is sufficient and this is obtained by closing one valve and therefore operating one stage of the pump, changing it in fact to a single stage pump. For fire service both stages are used and a pressure of 110 lbs. can be maintained. The speed, however, remains the same for both services. The exclusive rights to this double suction for Canada are owned by

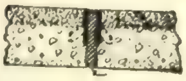


Patented Double Suction

THE JOHN McDOUGALL CALEDONIAN IRON WORKS CO., LIMITED

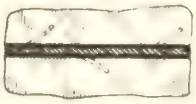
Works : Seigneurs & William Sts., MONTREAL   Sales Offices ; MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery, Pumps, centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants.



Cross-Section of Pavement Showing Expansion Joint.

Baker Armored Concrete Pavements



Longitudinal Section Showing Joint.

These concrete pavements have been in use so long that they have made an unrivaled record for service and efficiency. The shear members tie each plate securely to the end of the pavement slab. The expansion joint space between the protected edges of adjacent slabs is filled with felt, asphalt or other joint filler.

Protect the expansion joints from the constant friction and abrasion of traffic and you have protected the most vulnerable part of your pavement. **The wear is at the joints,** which in time break down and holes are formed. Baker Plates armor the slab ends and are a part of the pavement. The contracting slab takes the plate with it—the edge is always protected against wear. Baker Plates may be used in any concrete pavement.

Engineers, highway officials and paving contractors are invited to write for our free book of specifications for concrete pavements. Prices of Plates furnished upon application.

R. D. BAKER CO.   73 Home Bank Bldg., Detroit, Mich.

RAILWAY CONSTRUCTION PLANT

Hoisting Engines, Horse Powers, Hand Winches, Derricks, Car Wheels, Axles and Boxes, Dump Cars, Rail Cars, Buckets

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Makers of Hoisting Machinery BELLEVILLE, ONT.

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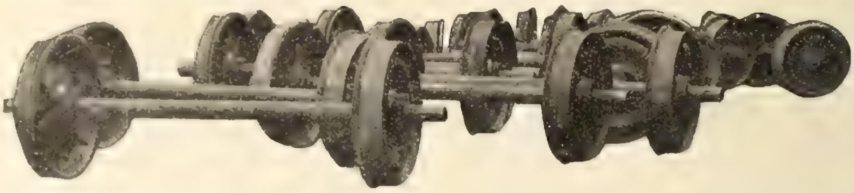
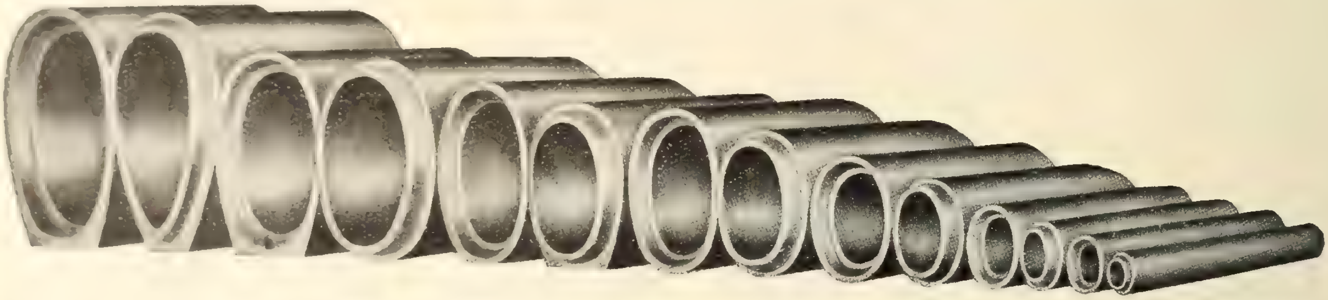
LIMITED

Montreal, Que.





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properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario

EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative: E. F. Dartnell, No. 8 Beaver Hall Square
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Wrought Iron Door Grills

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Push Plates

We make all sorts of work in wrought iron, brass and bronze, for the protection and decoration of the exterior and interior of buildings.

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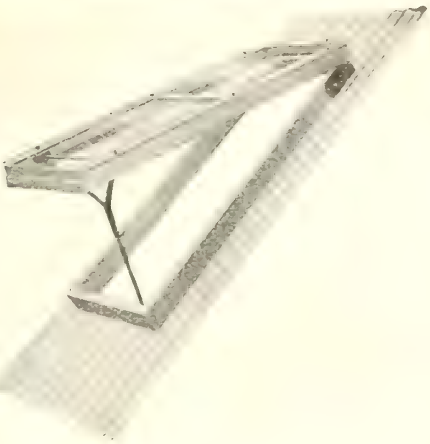
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET



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attached like an ordinary sheet of corrugated iron—no soldering nor flashing. Moveable or stationary sash, plain or wired glass. Made for corrugated iron or any other form of roofing.

Write for prices and full particulars

The Metallic Roofing Co.
LIMITED
Manufacturers
TORONTO, ONT. WINNIPEG, MAN.

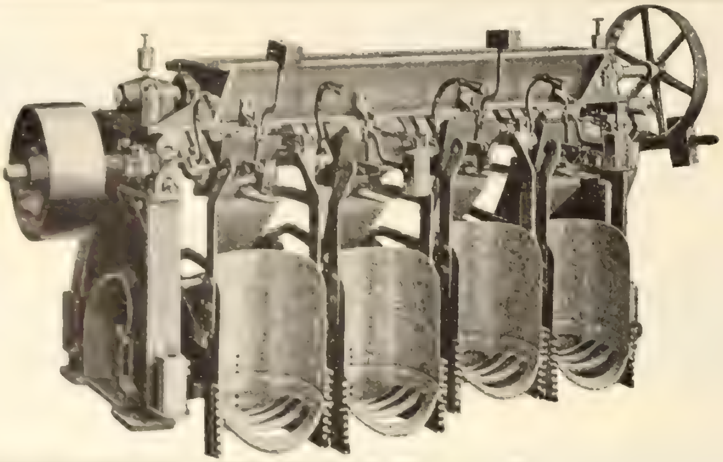
Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

No other metal lath is as good as Herringbone because no other metal lath has the Herringbone rib.

Clarence W. Noble, ***General Sales Agent***
117 Home Life Building, TORONTO
Metal Shingle & Siding Company, Manufacturers



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Mill Blocks
Sawed, Planed and Turned Stone

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(Incorporated)

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THE H. & E. PATENT BALL-BEARING LIFTING JACKS

For Railway and Bridge Work, Contractors' and Builders' Use

Made by practical Jack Builders. Material: best grades of malleable iron and stee Fully guaranteed as to durability and efficiency. The long even stroke of the lever together with the design and careful construction of the jack, makes it the quickest and easiest working lifting appliance on the market. Made in plain and foot-lift styles. Adapted to all classes of work where a lifting jack can be used. Sizes from 8 to 50 tons capacity now complete. Send for prices and discounts.

To any responsible Firm or Railway in Canada any of these jacks will be sent on 30 days trial.

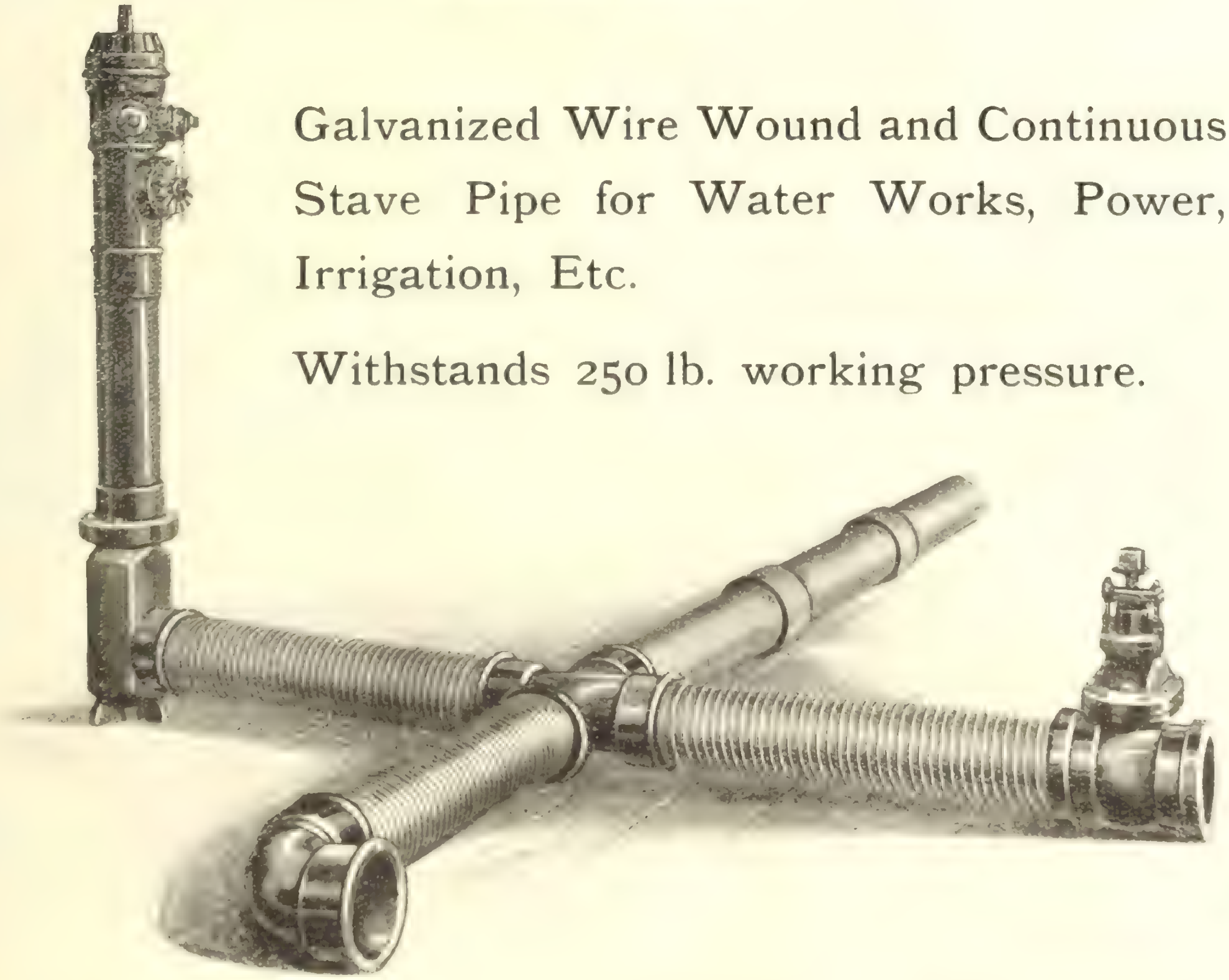
MANUFACTURED BY

Canada Lifting Jack Co., Ltd.
(Formerly the H. & E. Lifting Jack Co.)

Waterville, Que.

Stock carried by F. H. Hopkins & Company, Montreal

Wooden Water Pipe



Galvanized Wire Wound and Continuous Stave Pipe for Water Works, Power, Irrigation, Etc.

Withstands 250 lb. working pressure.

Not affected by Frost, Corrosion, Electricity or Acid. Water Works Systems installed. Prompt attention to inquirers. Write for prices.

Manufactured by

Canadian Pipe Co., Limited

Factory: 550 Pacific St., VANCOUVER, B. C.

P. O. BOX 915.

Current Prices of Building Material.

BRICKS

[illegible] delivered at [illegible]

	Per M
No 1 dry pressed red brick	$18 00
[illegible]	18 00
[illegible]	12 00
[illegible]	12 00
Wire cut bricks for foundation work	12 00
[illegible]	15 00
No 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

[illegible]

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No 2 Hemlock dimension and 1-in.	16 00	18 00

[illegible]

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

[illegible]

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

[illegible] Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.30; 1-inch, $1.35; ⅜-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.30 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

Lime, per cwt., delivered, not less than 1,500 lbs. 33 cents; white, 43 cents.

Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

PAINT AND OILS

Pure White Lead, ground in oil, $8.75 per 100 lbs

Boiled Linseed Oil, in bbls., 62c. per gal. of 9 lbs.

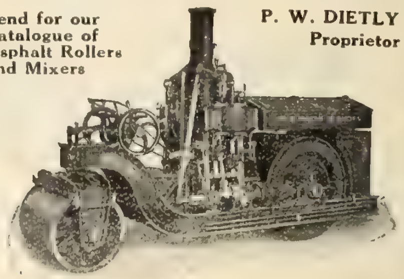
Raw Linseed Oil, in bbls., 59c. per gal. of 9 lbs.

Turpentine, in barrels, 58c per gallon.

Pure Red Lead, dry $7 to $8 per 100 lbs.

Putty, pure linseed oil, in bulk, bbls., 3½c.

Putty, pure linseed oil, in 25-lb. tins, 4c.



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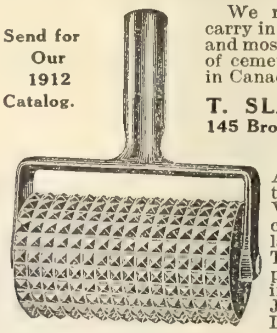

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"Abram" Sidewalk Tools have no competitors they are the original and only automatic "Wrist Motion" long handled tools. Write at once for our special December discount offer, and catalog free. Every set sold with a guarantee.
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Nature of the service.
Capacity of the cars and weight of train.
Character of track—is it new or old.
Length of haul.
Is time an important factor.
Do you want a quick locomotive or a big puller.
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All these items and more should be considered.
Our experience may be valuable in considering them.

A careful study of conditions may mean larger profits.
A dollar saved is more than a dollar earned.

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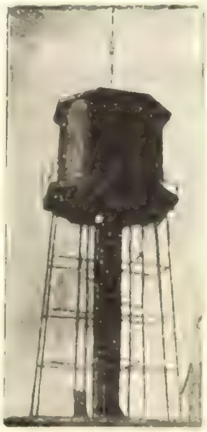

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Steel Substructures of all kinds
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Ontario Wind Engine & Pump Co.
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TORONTO WINNIPEG CALGARY

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This pavement was laid to secure a test of the wearing qualities of Wood Block.

The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

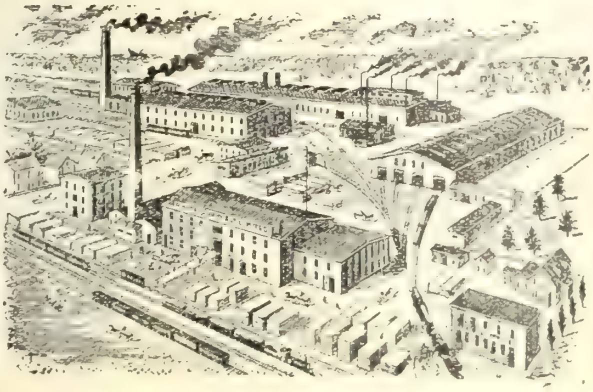
The Asphalt was taken up some time ago and street newly paved.

The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

The Dominion Creosoting Co., Ltd.
Vancouver, B. C.

Rhodes, Curry Co., Limited
Lessees



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We manufacture all kinds of building materials, including cast iron columns, cresting, sash weights, etc.

In addition to our large stock of native lumber, we are now carrying about one million feet of foreign lumber, including oak, walnut, ebony, whitewood, basswood, red cedar, Douglas fir, mahogany, &c.

Rhodes, Curry Co., Ltd. Amherst, N. S.
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The Mixer With a Record

THE BLYSTONE HAND TRUCK MIXER

For combination shop and outside use this Hand Truck Mixer is acknowledged to be the very best on the market. It has been used on hundreds of sidewalks and foundation contracts with unqualified success. It is strongly built and so simple in design that it will never give any trouble with repairs.

Strongly Made - Well Balanced Easy to fill Easy to Dump

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Full line of Blystone Mixers carried in stock by
The A. R. WILLIAMS MACHINERY COMPANY, Limited
Contractors Department No. 1, TORONTO, CAN.
Sole Distributors for Canada

Every Railway in Canada Uses
ASBESTOSLATE Cement Shingles

The Canadian Northern Railway Station at Fort Frances, Ont., is the latest of the many Canadian Railway buildings to be roofed with Asbestoslate Cement Shingles.

The choice of this roofing by all the Canadian Railways is most significant. It means that the keenest, most exacting buyers and maintenance men in the country are convinced of their superiority.

Made of Portland Cement and Asbestos, in Red, Gray and Slate, Asbestoslate Cement Shingles are fire-proof, weather-proof and practically indestructible.

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ASBESTOS
SHINGLES

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Asbestos Manufacturing Co., Ltd.
Address E. T. Bank Bldg., Montreal
Factory at Lachine, Que. (near Montreal)

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WIRE ROPE MANUFACTURERS,

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ELECTRIC CABLEWAY OVER THE ZAMBESI RIVER AT THE VICTORIA FALLS.
Span, 870 feet. Working Load, 10 tons. Main Cable 8¼″ circ. Breaking Stress of Main Cable, 275 tons.
Main Cable supplied by THOS. & WM SMITH LTD., Newcastle-on-Tyne.

HIGH-CLASS WIRE ROPES

For CONTRACTORS' WORK, such as BLONDINS, CRANES, INCLINES, BALLAST ROPES,
&c., &c., and all classes of work requiring Wire Ropes.

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Orleans Filtration Plant and Concrete Building taking about 100,000 barrels of Alsen's New Cement

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Stand Pipes and Water Towers for Corporations a Specialty

Expert Builders of
Steel Plate and Structural Iron Work
of all descriptions

Storage and Pressure Tanks of various capacities carried in stock.

Write for Quotations

The Toronto Iron Works, Limited
TORONTO, ONT.

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MEXICAN ASPHALT

HERKIMER ST., HAMILTON. Paved with our Mexican Asphalt.

Write for analysis and samples.

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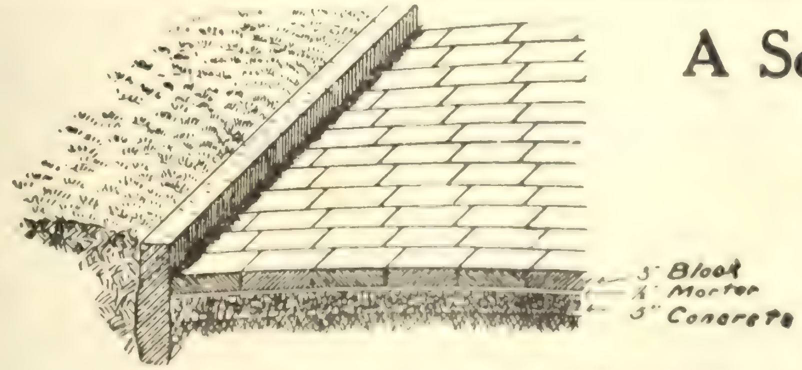

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must be

Durable and Non-Abrasive.
Non-Absorbent and nearly Noiseless.
Unaffected by extremes of Temperature.
Sightly and Sanitary.
Easily Repaired and Easily Cleaned.

These requirements are met by
Asphalt Block Pavements
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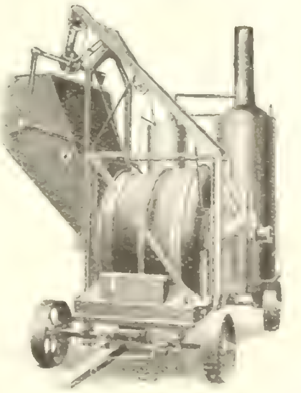

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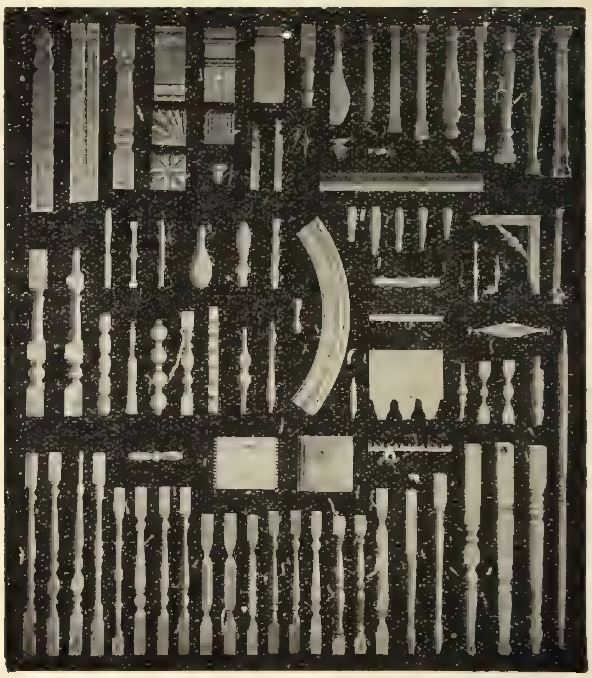

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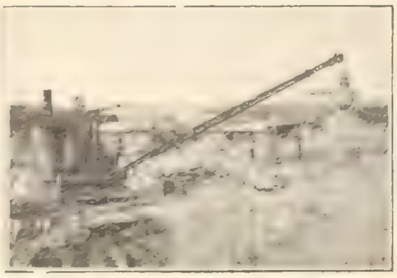

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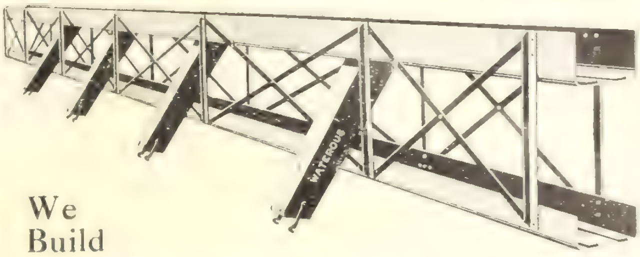

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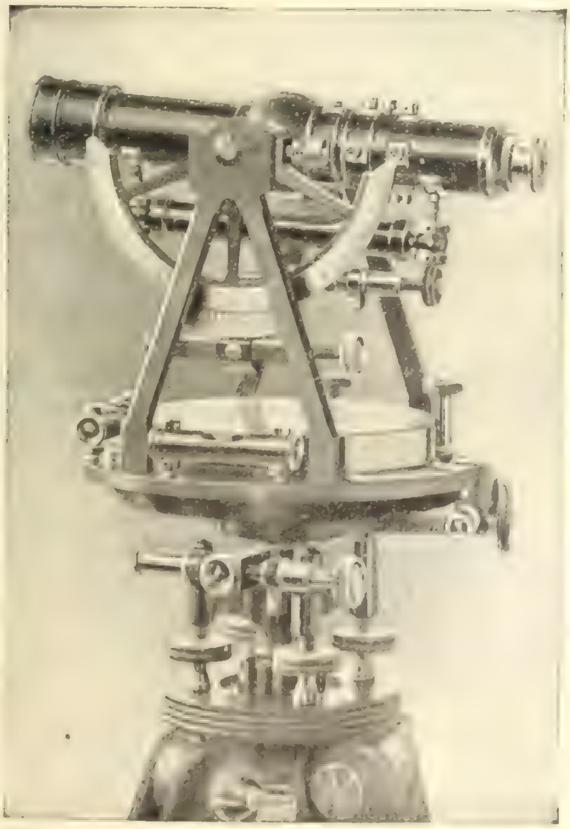

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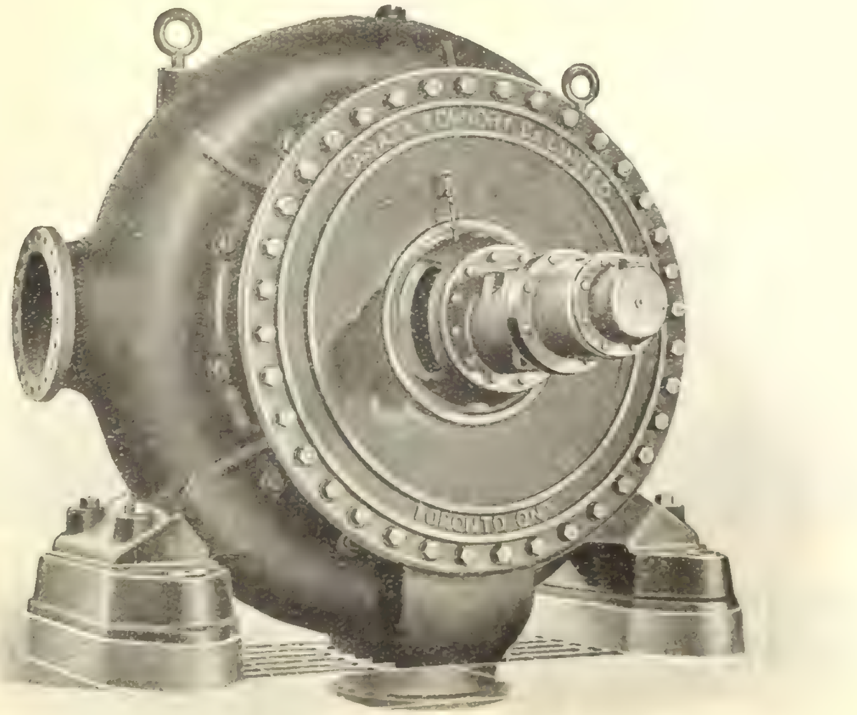

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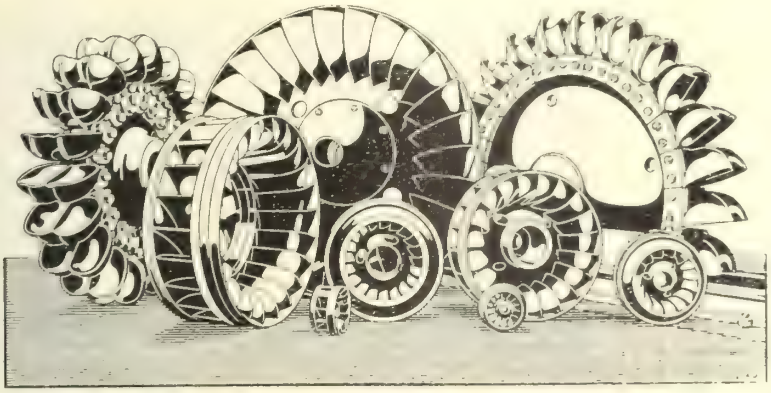

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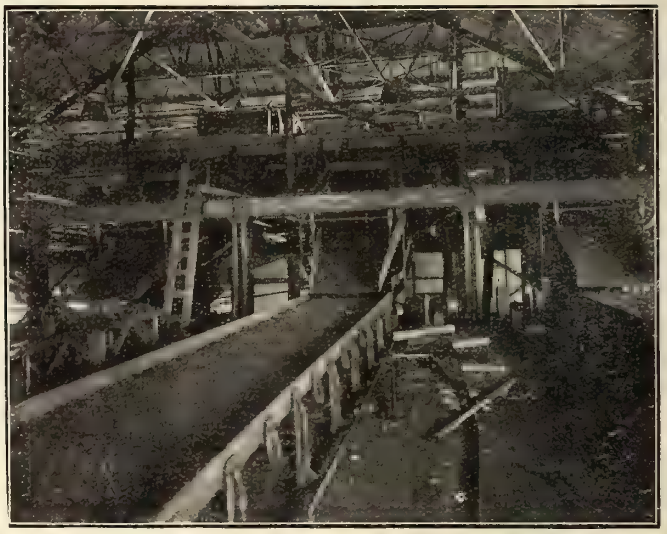

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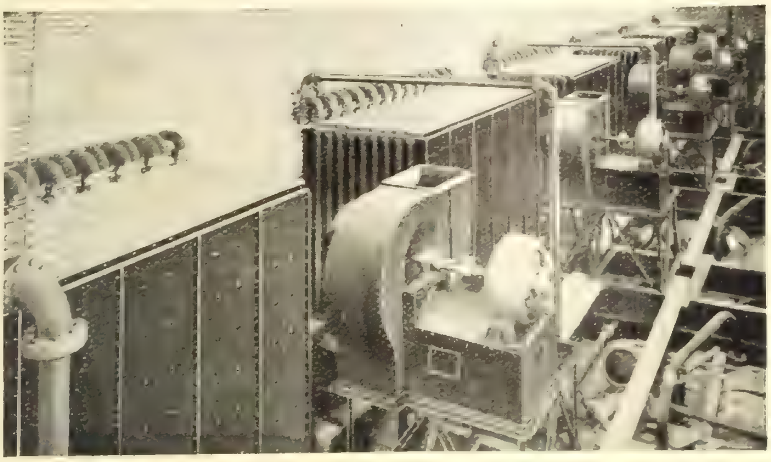

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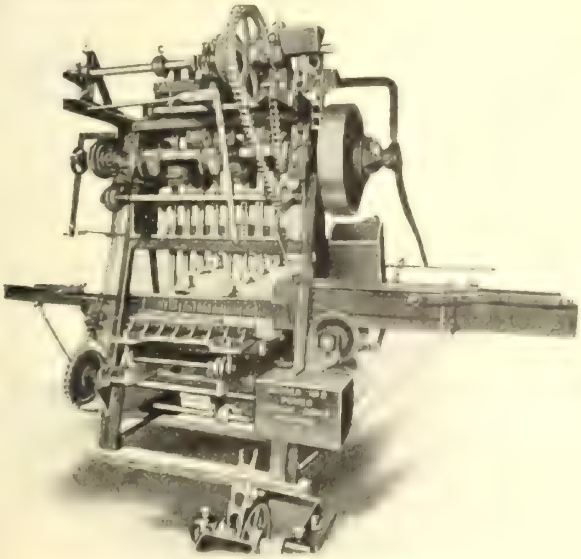

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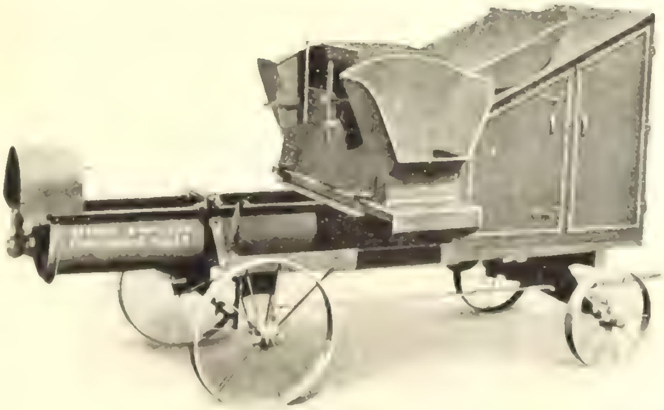

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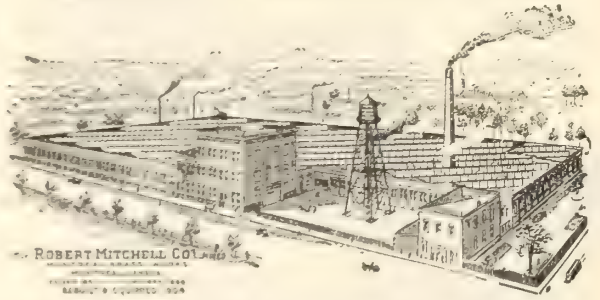
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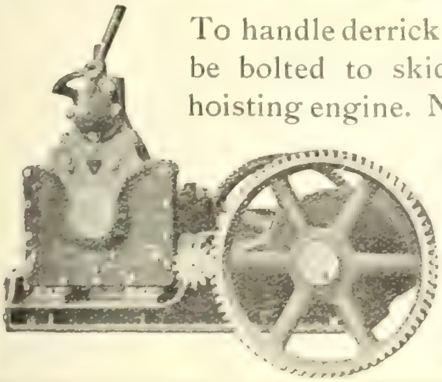

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"TAMCO" Crushed Stone in all sizes, for all purposes.
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BRIDGE PIERS
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RENFREW?

If you don't, you are missing an opportunity of saving 75 cents a day on each bricklayer, and of laying 200 more bricks a day.

"RENFREW" LIME requires less time for tempering. Does not set so rapidly and allows the bricklayer to spread for more bricks.

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We can supply any quantity any time

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We Carry a Large Stock

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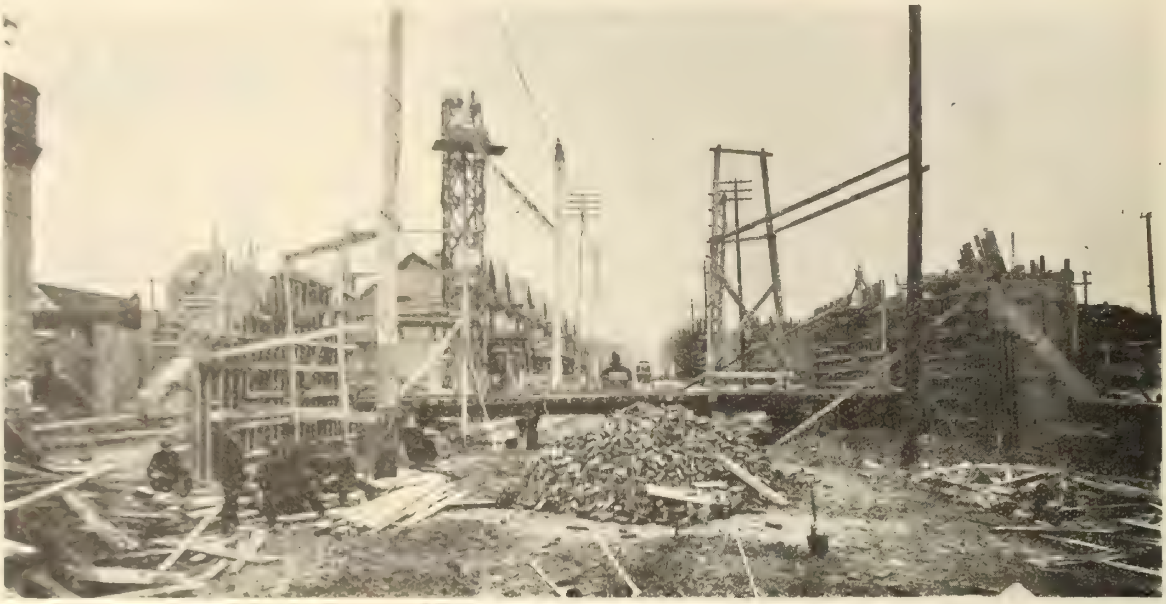

C. P. R. Subway at Avenue Road, showing six weeks progress

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Phone Ade. 292

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On All Classes of Work KOEHRING MIXERS are mixing their way to popularity because of the Dollar Saving Qualities

The Koehring 3 in 1 principle of mixing means three times as much mixing or an equal amount of mixing in one-third of the time. There are three independent and opposed mixing actions in the Koehring drum producing thoroughness of mixing and rapidity of mixing and a uniformity of mixing, no other Mixer equals. There are also equally important advantages in the mechanical construction of the Koehring Mixer.

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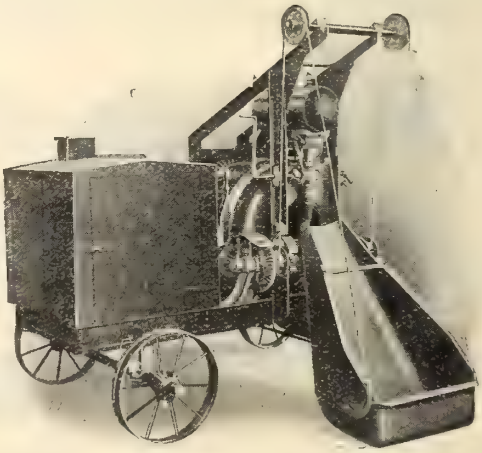
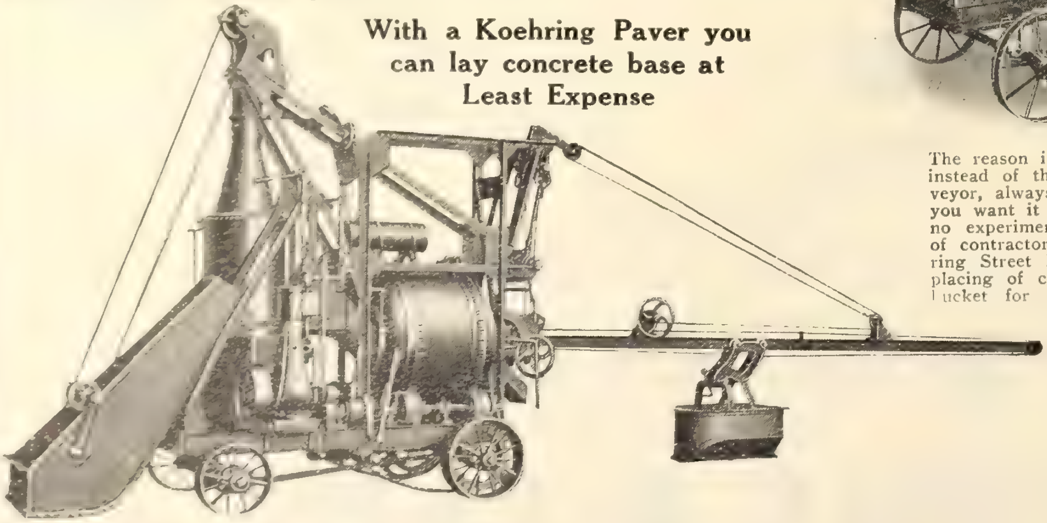


With a Koehring Paver you can lay concrete base at Least Expense



The reason is the machine conveys the concrete instead of the men, and it's a dependable conveyor, always places the concrete exactly where you want it and always dumps clean. There is no experiment about it, the records of dozens of contractors prove the economy of the Koehring Street Paving Mixer and it combines this placing of concrete with a simple charging bucket for getting material into the drum in shortest possible time and least number of men, also, it has traction drive for moving the machine along the line of work and keeping close to the material pile. This builds contractors' reputations and pays handsome profits. Aren't you interested in this reputation and profit making?

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Today, as never before, time is reckoned in dollars and cents. If your salesmen can save hours in searching for prospects, you save capital by coining it into money.

The greatest savers of time, effort and money for the business man of today are MacLean Daily Reports. They are the direct route from the man who is buying to the man who is selling. They enable your salesmen to devote their time in following up business after it has been located, instead of trying to locate it.

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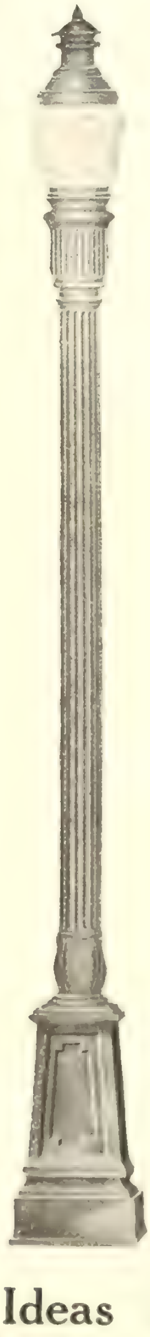

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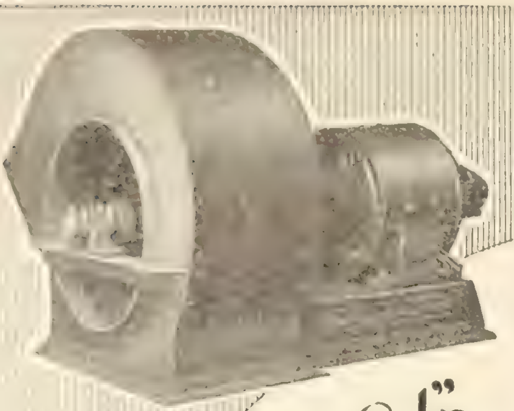

"Buffalo" Fans

For Heating, Ventilating, Drying and Exhausting.

Ask our engineers to recommend the fan best suited to your requirements. Our designs include the new high-efficiency "*Conoidal*" multiblade fan, used extensively for heating systems, mine and tunnel ventilation, and the motor-driven *Steel Plate Pressure Blower*, giving pressures up to 24 oz. Both of these designs show higher efficiency than obtained with any similar types. We specialize in *direct-connected* units (motor, engine or turbine driven) for every service. These are distinguished by absence of belt troubles and the very lowest power consumption. Whatever your problem write us.

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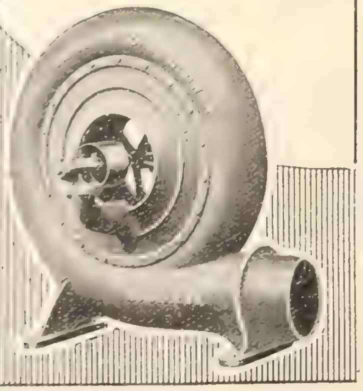

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Our Policy: the production of materials sufficient in every way for successful accomplishment in the above field.

Our Materials: built along approved methods with only the best ingredients entering into their composition.

Our Trade: Architects, Engineers and Builders who desire positive results at fair cost.

The Dehydratines—bituminous liquids and mastics for water proofing or damp proofing under what is termed The Membraneous Method.

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Symentrex—the king of cement coatings.

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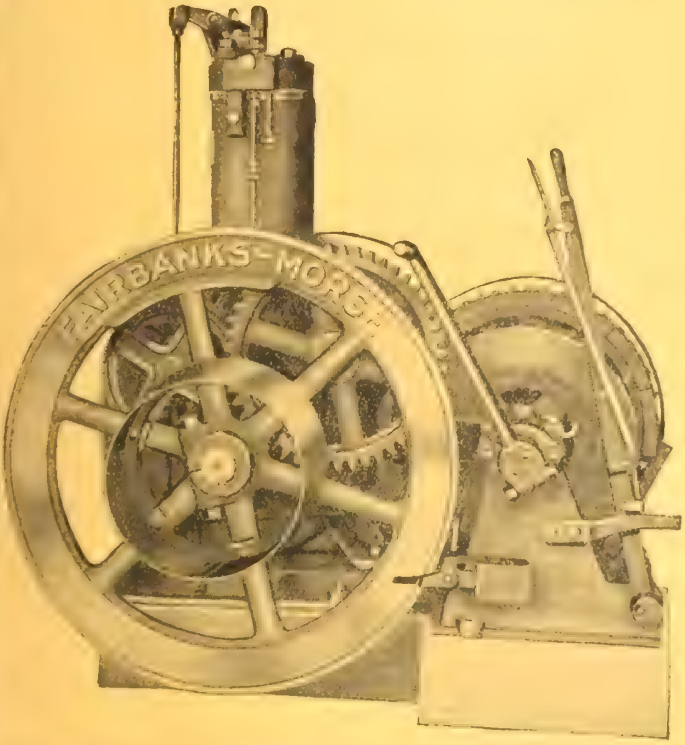

The Fairbanks-Morse Type "T" Vertical Geared Hoisting Engine shown here is one of the most economical, durable and efficient hoists on the market. This is a 6 h.p., but they are made in sizes from 2 to 12 h.p. They are regularly fitted for gasoline, benzine or naphtha, but can be furnished to operate on oil or alcohol.

The drum runs loose on the shaft, while the large gear is keyed fast. A friction clutch mechanism, with conical surfaces, is mounted on the drum, which enables the load to be handled quickly and positively by means of a hand lever. The gearing connecting engine to the hoist drum can be thrown out of mesh, when it is desired to use the engine for other purposes.

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Building construction
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Are made according to the specifications of the National Board of Fire Underwriters. The conductors are drawn from copper of the highest conductivity and are covered with two thicknesses of thoroughly vulcanized rubber compound of high quality. The wires are braided over insulation and the smooth high finish they receive makes them specially desirable for conduit work.

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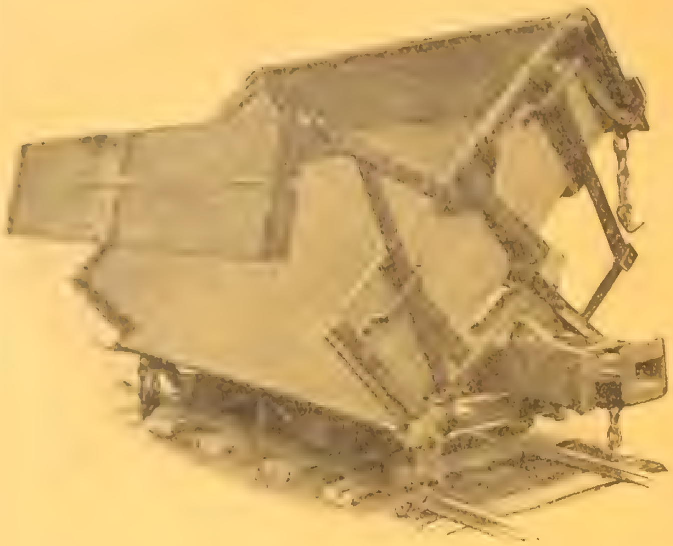

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Dump Cars

Our Dump Cars will give you entire satisfaction. We can supply cars in all capacities for any practical guage. Wheels are all properly chilled and the construction and material used are the best.

Our Cars are declared by steam shovel and car men to be superior to all others, both in construction and operation.

Let us have your enquiry, we would be pleased to submit full particulars and prices at any time.

"Davenport" Saddle Tank Locomotives

For Contractors and Quarry Service

Supplied in any size for any practical guage track.

"Marion" Steam Shovels

For Railroads — Contractors — Brickyards, Etc.

We supply Steam Shovels in all sizes. Can furnish both Standard and Revolving types. Write us stating your special requirements and we will be pleased to submit proposition.

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Vol. 27 Toronto, February 26, 1913 No. 9

Contract Record and Engineering Review

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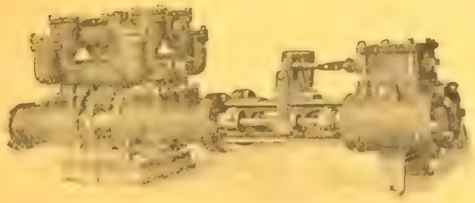

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Made in all Kinds of Glass on Short Notice

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OF BELLISS MAKE
have gained their reputation for

- Simplicity of Design
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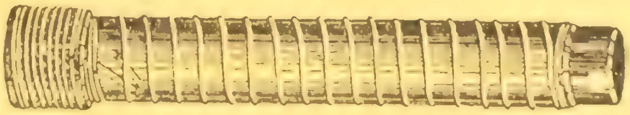

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for city and town Water Systems, Fire Protection, Power Plants, Hydraulic Mining, Irrigation, etc. One half the cost of Iron Pipe—and better.

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Full Particulars and Estimates Furnished

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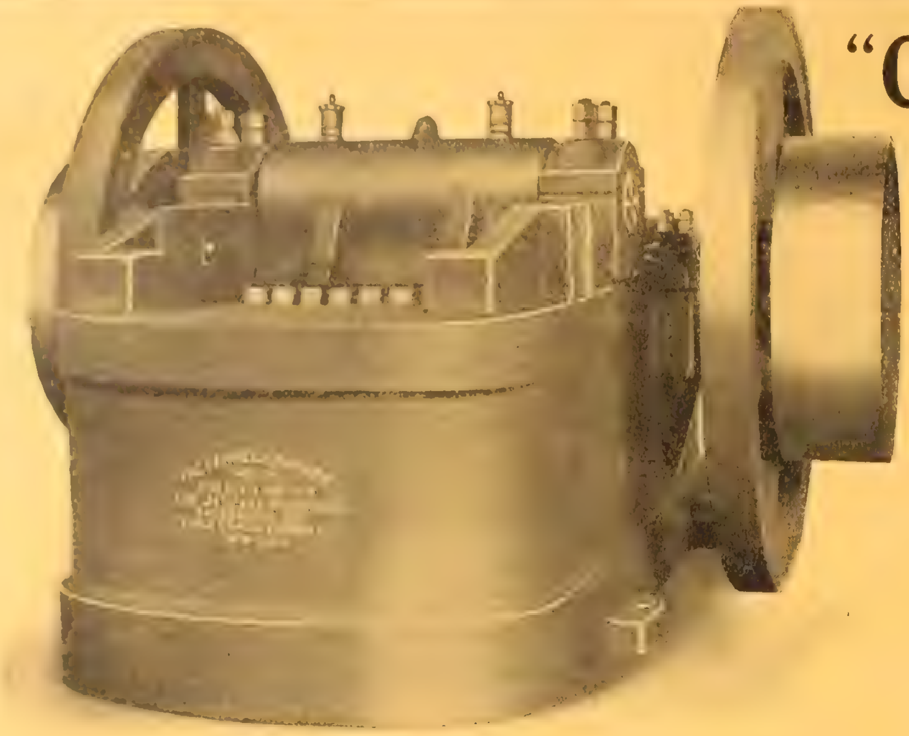

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Complete Crushing Plants

Our Specialty

Many Years Experience and Exceptional Facilities

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Loaded with DOLLARS is assured to all users of

"American" Derricks

which meet the three principal requirements of modern construction work

Reliability—Rapidity—Economy

There isn't a day that we don't help some contractor to success. May we help you today?

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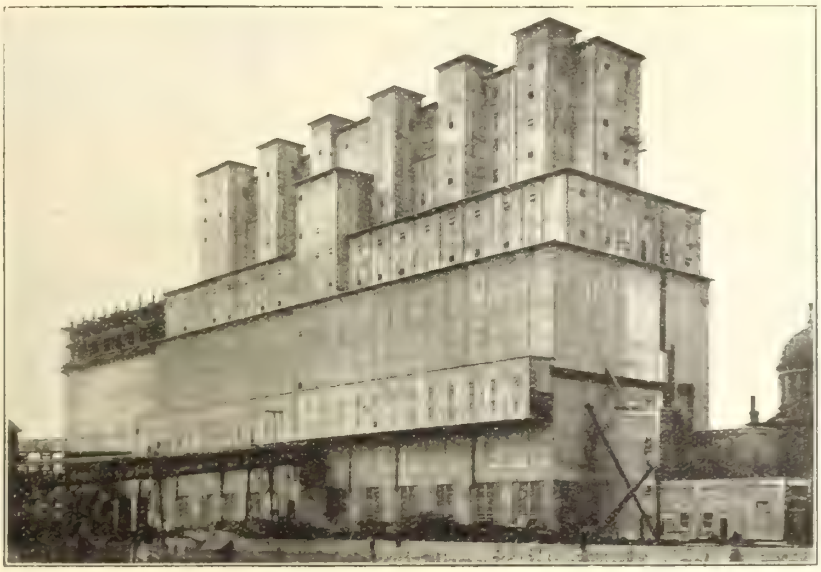

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The new grain elevator just completed by the Harbour Commissioners of Montreal, is one of the largest in the world. It has a capacity of 2,622,000 bushels, covers an area of 456 x 100 feet and is 242 feet high. Besides its immense storage capacity, it is provided with every facility for the proper handling of grain. Provision is made for unloading either from railroad cars or inland steamers and for loading ocean-going vessels for all parts of the world.

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Canada Cement will satisfy your most exacting requirements, just as it satisfied the requirements of this great work.

Canada Cement Company
Limited
Montreal

SALES OFFICES
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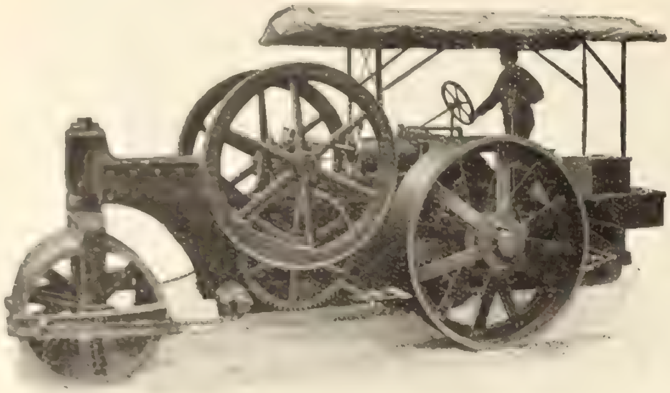

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Machinery and Material are essential to make good roads.

We supply only the very highest grade of Road Making Equipment.

"Austin" Motor Road Rollers are efficient. Easy to start, easy to run and economical.

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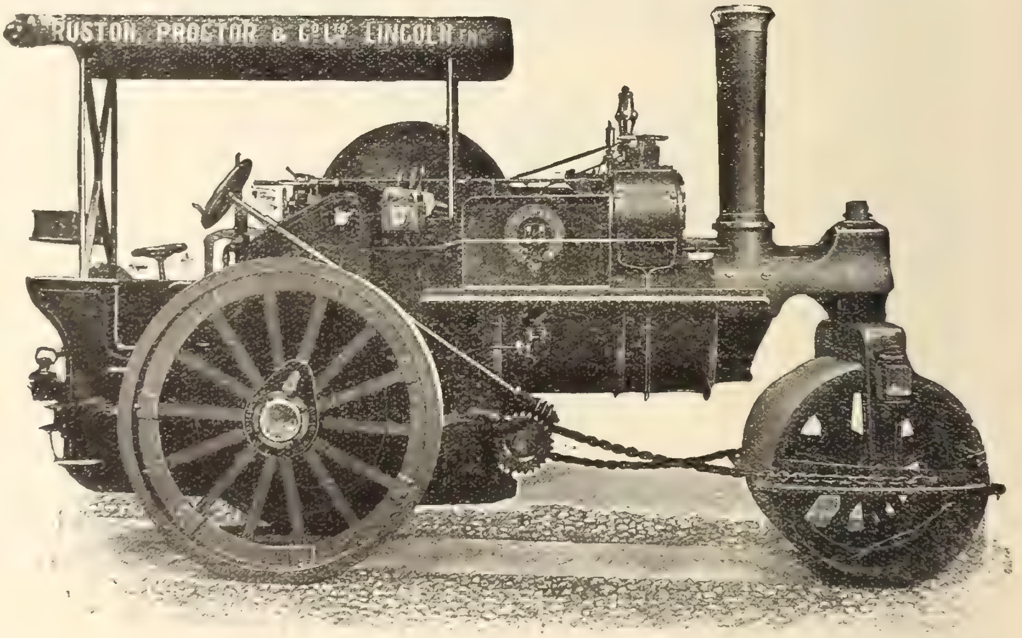

effect a great saving in fuel.

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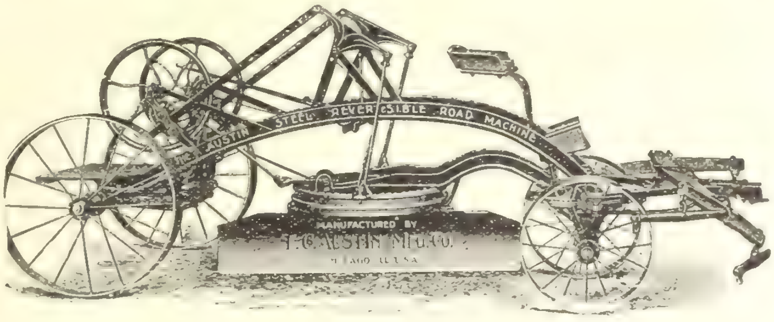
Road-Making Machinery

is one of our
Specialties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MANUFACTURED BY
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Road Graders
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Rock Crushers
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Catalogues on any of these machines on request

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- Hancock, H. Syd.
- Inglis, John
- Kennedy, Jas. C.
- Kortring & Green
- Lea & Ferguson.
- Mitchell, C. H.
- Wood and Service

Expansion Bolts
- Star Expansion Bolt Co.

Expanded Metal
- Mannesmann Tube Co

Exhaust Heads
- Canadian Buffalo Forge Co.
- Sheldons Limited
- Sturtevant Co. of Can. Ltd., B. F.

Field Instruments
- Ainsworth, Wm. & Sons
- Buff & Buff Mfg. Co.
- Gurley, W. & L. E.

Filler, Floor and Sewer Joint Asphalt
- Canadian Mineral Rubber Co.

Filters
- American Water Softener Co.

Fire Brick
- Improved Equipment Co.
- Smyth & Ryan

Fireproof Doors and Windows
- Metal Shingle & Siding Co.
- Mussens Limited
- Ormsby, A. B.
- Steel & Radiation Ltd.

Fuse (Safety Blasting)
- Lecky & Collis

Forges
- Canadian Buffalo Forge Co.

Furnaces (Special)
- Improved Equipment Co.

Gas and Electric Light Fixtures
- Mitchell Co., Robert.

Gas Plants Complete
- Improved Equipment Co.

Gas Producers for Heating
- Improved Equipment Co.

Gas Machinery
- Improved Equipment Co.

Glass
- Consolidated Glass Co.
- Hamilton Art Glass Co.
- Hobbs Mfg. Co.
- Luxfer Prism Co.
- Toronto Plate Glass Imp't'g Co

Hammer Drills
- Canadian Ingersoll-Rand Co.

Heating Apparatus
- Canadian Buffalo Forge Co.
- Sheldons Limited
- Jenckes Machine Co.

High Pressure Pipe Lines
- Canadian Boving Co.
- Escher Wyss & Co.

Hoisting Apparatus
- American Hoist & Derrick Co.
- Beatty & Sons, M.
- Browning Engineering Co.
- Canadian Fairbanks-Morse Co.
- Canadian Ingersoll-Rand Co.
- Doty Marine Engine & Boiler Co
- Inglis, John
- Jenckes Machine Co.
- Hopkins & Co., F. H.
- Lecky & Collis
- Marsh & Henthorn
- Mussens Limited
- Royce Limited
- Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
- Canadian Fairbanks-Morse Co.

Horse Stable Fittings
- Beatty Bros.

Hydrants
- Canada Iron Corporation
- Gartshore-Thomson Pipe Co.
- Kerr Engine Co.

(Continued on page 12)

Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.

Lumsden Building, Toronto

J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.

Don Valley Fireproofing, Bricks and Tile used throughout.

Traders Bank, Toronto

Carrere & Hastings and F. S. Baker, Associate Architects.

Don Valley Porous Terra Cotta Fireproofing and 2,000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

Royal Bank, Toronto

Ernest G. Bird, associated with Carrere & Hastings, Architects. Norcross Bros., Contractors.

Don Valley Porous Terra Cotta Fireproofing and Brick used.

Bell Telephone Building

Adelaide Street, Toronto

W. J. Carmichael, Architect. [illegible], Limited, Contractors.

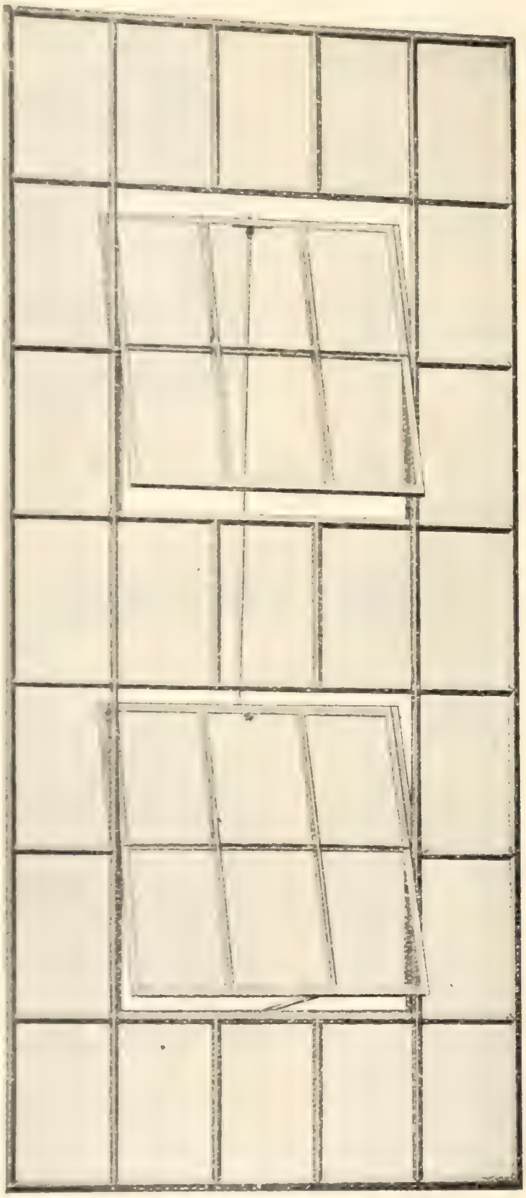
Don Valley Porous Terra Cotta Fireproofing and Brick used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

TORONTO - ONTARIO

LET IN THE LIGHT



"Fenestra"

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,

Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons,
Railroad Shops, Warehouses, Barracks, etc.

We will help you to settle the problem of your window requirements—write us.

STEEL and RADIATION, Limited

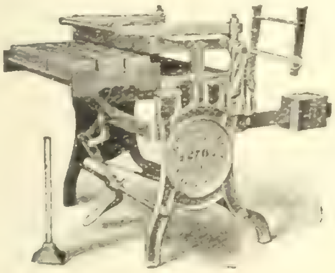
TORONTO, CANADA

Before you Buy Machinery or Equipment of any kind

write to us for our 1913 CATALOGUE. It will save you TIME and MONEY. Do you know that we are the ONLY LARGE MANUFACTURERS who specialize on

Concrete Machinery and Contractors' Equipment

The following are a few of our lines



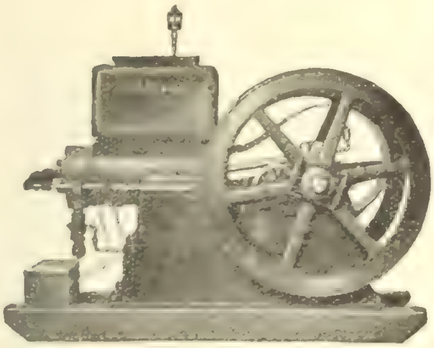
London Cement Brick Machine

London Standard Drum Batch Mixer in five sizes any kind of power or equipment.

Drum Paving Mixer with forward loader and rear discharge.

Drum Paving Mixer with side loader and rear discharge.

London Automatic Batch Mixer No. 1



Standard Gasoline Engine

Automatc Batch Mixer Two sizes any kind of Power.

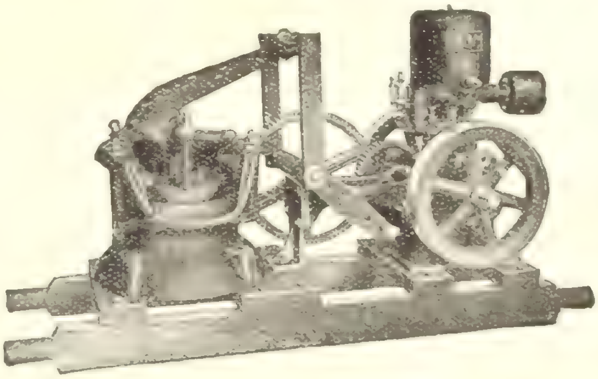
Mortar Mixers.

Hand Power Concrete Mixers.

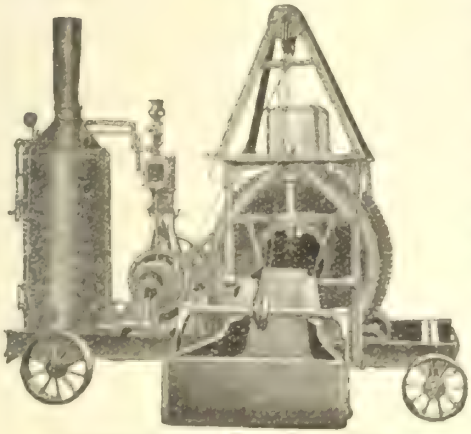
Tile Moulds.

Cement Block Machines.

Cement Brick Machines.



Power Operated Diaphram Pump



London Standard Drum Batch Mixer

Cement Tile Machines.
Side Walk Tile Machines.
Sill Step and **Window Cap Moulds.**
Ornamental Moulds.
Rock Crusher.
Screen and **Elevators.**
Mason's Sand.
Screening Machine.
Gasoline Engines.
Pumping Outfit.
Gasoline Hoists.
Sidewalk Forms.
Material Elevators.

Driers both Portable and Stationary.
Fence Post Moulds.
Concrete Carts.
Wheelbarrows.

London Face Down Concrete Block Machine

And a Complete Line of Cement Working Tools.

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, 445 Main St. W. H. Rosevear, Mgr.
CALGARY, 622 9th Ave. W. P. D. McLaren, Mgr.
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, 106 Pleasant St. G. B. Oland, Mgr

AGENCIES:

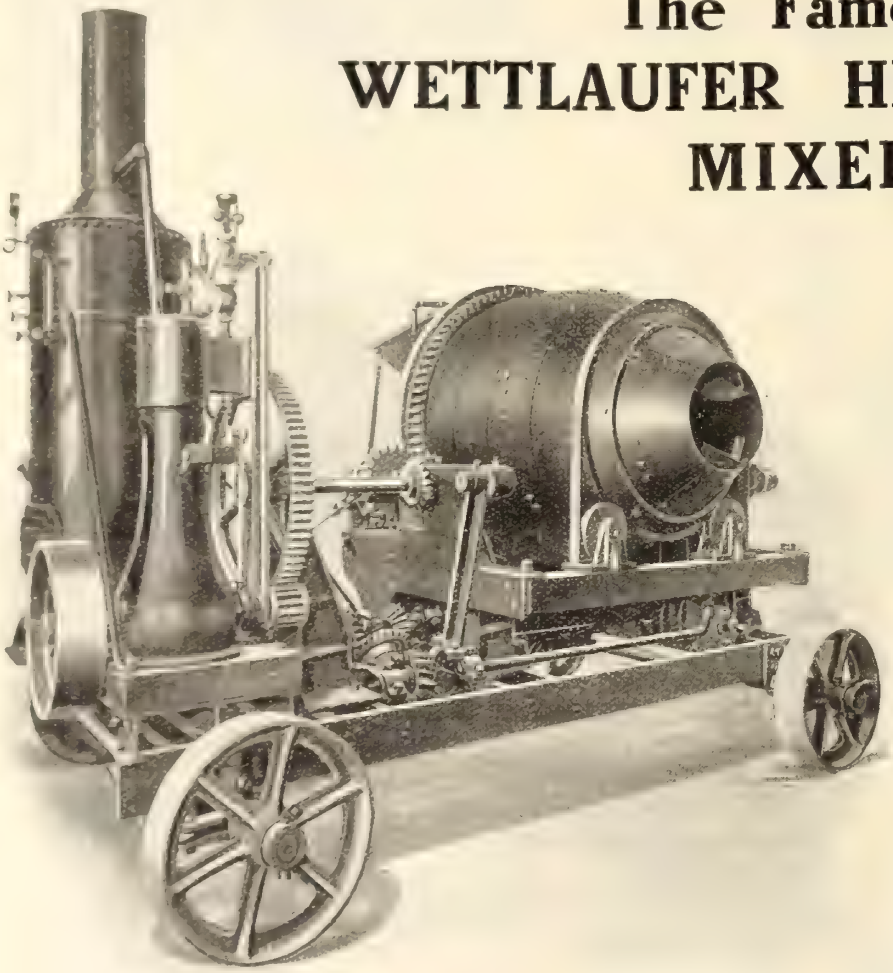
VANCOUVER, B. C. Equipment Co.,
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng. & Supply Co.
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

EVENTUALLY

—WHY NOT NOW?

You **must** have a **Good Mixer** some time—You can't go on putting up with a poor makeshift—You will realize some time that you **must** have a mixer that will do the best work, and when you realize that you will naturally turn to

The Famous
WETTLAUFER HEARTSHAPE MIXER



This is the mixer that will do **good work** for you **all the time** — the mixer that saves you time and money and increases the efficiency of your equipment.

Strong Construction

Automatic Operation

Low Working Cost

Rapid and Perfect Mixing

Increased Capacity

Minimum Repairs

Full particulars and catalogue on request.

Come and see this mixer working—Continuous demonstrations at

WETTLAUFER BROTHERS

TORONTO, ONTARIO

FACTORIES : **Mitchell, Ont.** **Buffalo, N. Y.** **Detroit, Mich.**

AGENCIES :

A. R. Williams Machinery Co.
15 Dock St., St. John, N. B.

Lavallee Ross, Limited
Alexandra Block, Howard Ave.
Edmonton, Alta.

Hooton & Moore
613 Ashdown Block,
Winnipeg, Man.

MONTREAL OFFICE and WAREROOMS : **316 Lagauchetiere St. W.** **Head Office : TORONTO, Ont., 178 Spadina Ave.**

For Your Next Shipment of Cement, Order

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

ROGERS

Portland Cement

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at

Kirkfield - Owen Sound - Hanover - Orangeville - St. Mary's

Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone--but cheaper. —A perfect imitation— Adaptable to all ornamentation or architectural decoration, both interior and exterior.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

28 King St. West
Toronto, Ontario

Western Sales Manager
W. J. DINNEN & CO., Winnipeg, Man.

CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

Ice Making Machinery
  Linde British Refrigeration Co.
Insulating Compounds
  Canadian Mineral Rubber Co.
  Standard Underground Cable Co. of Canada Limited

Interior Finish and Doors
  [illegible]
  Canada Office & School Fur. Co.
  Oshawa Int. Fittings Co.
  Rhodes Curry & Co.

Kilns
  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F

Lime
  Jamieson Lime Co.
  Ontario Lime Association

Lime Kilns
  Improved Equipment Co.

Locomotives
  Canadian Boving Co.
  Montreal Locomotive Works
  Canada Foundry Co.

Marble
  Dominion Marble Co.
  Lautz Company
  Missisquoi Marble Co.

Metal Lath
  Greening Wire Co., B.
  Metallic Roofing Co.
  Noble, C. W.
  Steel & Radiation Ltd.

Metal Forms
  Hotchkiss Lock Metal Form Co.

Meters, Electrical
  Ferranti Electrical Mfg. Co.

Meters, Water
  Hopkins & Co., F. H.
  McDougall Caledonian Iron Wks
  Neptune Meter Co.

Motor Trucks
  Jones & Glassco

Packing and Pipe Coverings
  Garlock Packing Co.

Paints (Bridge and Structural Iron and Pipe Coating)
  Canadian Mineral Rubber Co.

Paints and Varnishes
  Elaterite Paint Co.
  Gohcen Co.
  Pinchin, Johnson & Co.

Paving Cement
  Canadian Mineral Rubber Co.

Paving and Paving Materials
  Dominion Creosoting Company
  Metropolitan Paving Brick Co.
  Ontario Asphalt Block Co.
  Paterson Mfg. Co.

Perforated Metals
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Pipe (Concrete, Iron and Wood)
  American Spiral Pipe Works
  Canadian Pipe Co.
  Dominion Concrete Co.
  Gartshore-Thomson Pipe Co.
  Munderloh & Co.
  National Iron Works
  National Pipe & Foundry Co.
  Pacific Coast Pipe Co.
  Pedlar People Limited.
  Piggott & Co., Thos.

Pile Driving Machinery
  American Hoist & Derrick Co.
  Browning Engineering Co.
  Canadian Ingersoll-Rand Co.
  Lecky & Collis
  Vulcan Iron Works

Planing Mill Exhausters
  Canadian Buffalo Forge Co.
  Sheldons Limited

Plaster
  Alabastine Co.
  Albert Mfg. Co.
  Britnell & Co.
  Crown Gypsum Company

Plug Drillers
  Canadian Ingersoll-Rand Co.

Plumbers' Supplies
  Standard Ideal Co.
Plumbers and Steam Fitters Brass Goods
  Mitchell Company, Robt.

Pneumatic Machinery
  Canadian Ingersoll-Rand Co.

Portable Saws
  Canadian Fairbanks-Morse Co.

Portable Track
  Bechtels Limited

Power Engines
  Inglis Company, John

Pumps and Pumping Machinery
  Bates & Edmonds
  Beatty & Sons, M.
  Canada Foundry Co.
  Canadian Boving Co.
  Canadian Buffalo Forge Co.
  Canadian Fairbanks-Morse Co.
  Canadian Ingersoll-Rand Co.
  Cook, A. D.
  Escher Wyss & Co.
  General Supply Co.
  Hamilton Mfg. Co., Wm.
  Hopkins & Co., F. H.
  Inglis & Co., John
  McDougall Caledonian Iron Wks.
  Smart-Turner Machine Co.
  Waterous Engine Works Co.
  Mussens Limited
  Ontario Wind Eng. & Pump Co.

Quarry Machinery
  Canadian Ingersoll-Rand Co.
  Improved Equipment Co.
  Lecky & Collis
  George Anderson & Co.

Railway Supplies
  Gartshore, John J.
  Hopkins & Co., F. H.
  Mussens Limited

Refrigeration Machinery
  Linde British Refrigeration Co.

Reinforcements, Concrete & Steel
  Ambursen Hydraulic Cons. Co.
  Canada Steel Co., Ltd.
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.
  Steel Co. of Canada
  Steel & Radiation Ltd.
  Trussed Concrete Steel Co.
  Turner, C. A. P.

Revolving Stone Screens
  Greening Wire Co., B.

Road Asphalt
  Canadian Mineral Rubber Co.

Road Machinery
  Erie Machine Shops
  Lecky & Collis
  Morrison & Co., T. A.
  Mussens Limited
  Waterous Engine Works Co.
  Western Wheeled Scraper Co.

Roofing Material
  Asbestos Mfg. Co.
  Can. H. W. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Canadian Supply Company
  Metallic Roofing Co.
  Noble, Clarence W.
  Paterson Mfg. Co.

(Continued on page 14)

ACCURATE METERS

Ferranti

Glass Case—Top Connections

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Steel Case—Top or Bottom Connections

The Ferranti Electrical Co. of Canada, Limited

TORONTO, 90 Sherbourne St. WINNIPEG, 56 Albert St.

The Real Belt Test is Actual Service

You do not care what tests a belt will stand unless it stands up under one—actual service.

The Sawyer Canvas Belt stands the hardest service in Brick and Clay Plants

This is one of the many classes of work to which Sawyer is particularly adapted. Whether you want a main drive, or smaller drive, or a large elevator belt, the Sawyer will do the work.
Write for our book "Stunts," which shows how others utilize Sawyer Canvas Belts.

Sawyer Belting Co., Cleveland, O.

In Building Canals

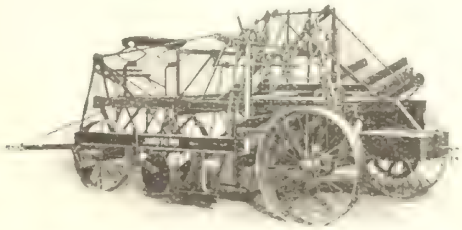
Excavating Ditches, Reservoirs, Loading Wagons, Building Levees, Embankments, etc., there's an unequaled saving in using the sturdy

Western Elevating Grader

Will move 1000 cubic yards per day. Free from complicated parts. Built strong. No annoying breakdowns. Has made records as to strength and durability. There are many "reasons why" you need the Western Elevating Grader. Our Catalog will tell you.

Write today.

Western Wheeled Scraper Co.
Aurora, Illinois
Earth and Stone Handling Machinery
E. P. Jamison & Company, Ltd., Vancouver
Agents for British Columbia



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902
Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS	1903	$ 0.00	1908	$ 93.26
	1904	3.30	1909	200.46
	1905	9.35	1910	14.07
	1906	37.33	1911	2.29
	1907	16.11		

Total $376.17 or 5⅔c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.
Limited
Hagersville, Ont.

CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

Rubber Belting
  Gutta Percha & Rubber Co.

Safes and Vaults
  Taylor, J. & J.

Sand and Gravel
  [illegible]
  York Sand and Gravel Co.

Screens
  Canada Wire & Iron Goods Co.
  Greening Wire Mfg. Co., B.

Sewer Joint Asphalt
  Canadian Mineral Rubber Co.

Sewer Pipe
  Britnell & Co.
  Canada Iron Corporation
  Dominion Sewer Pipe Co.
  Gartshore Thomson Pipe Co.
  National Iron Works
  Ontario Sewer Pipe Co.
  Smyth & Ryan
  Standard Clay Products Ltd.

Sewer Trenching
  Lecky & Collis

Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
  Browning Engineering Co.
  Beatty & Sons, M.
  Canada Foundry Co., F. H.
  Hopkins & Co., F. H.
  Montreal Locomotive Works
  Mussens Limited
  Thew Automatic Shovel Co.
  Willis Shaw Mach. Co.

Shovels
  Lundy Shovel & Tool Co.

Smoke Stacks
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
  Cabot, Inc., Samuel
  Pinchin, Johnson & Co.

Steam Apparatus
  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Steam Turbines
  McDougall Caledonian Iron Wks.

Steel
  Canada Steel Co., Ltd.
  Dominion Steel Castings Co.
  Lecky & Collis
  Provincial Steel Co.

Steel Bars
  Canada Steel Co., Ltd.
  Steel Co. of Canada.
  Steel & Radiation, Ltd.

Stone
  Britnell & Co.
  Brodie, Jas.
  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
  Roman Stone Co.
  Sackville Freestone Co.
  Sand & Supplies
  Smyth & Ryan

Stone Saws
  Anderson, Geo.

Structural Iron and Steel
  Canada Steel Co.
  DesMoines Bridge Co.
  Dominion Bridge Co.
  Dominion Steel Castings Co.
  Hamilton Bridge Works Co.
  Mackinnon Holmes & Co.
  McNeil & Co., W. P.
  Phoenix Bridge & Iron Works
  Provincial Steel Company
  Reid & Brown
  Sarnia Bridge Company
  Steel Co. of Canada
  Structural Steel Co.
  Standard Steel Construction Co

Submarine Drills
  Canadian Mineral Rubber Co.
  Lecky & Collis

Swinging Gears
  Dake Engine Company

Tanks and Stand Pipes
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.
  Inglis, John
  Jenckes Machine Co.
  Marsh & Henthorn
  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Waterous Engine Works Co.

Testing and Inspecting Bureau
  Hunt & Co., Robt. W.

Valves
  Canada Iron Corporation
  Gartshore-Thomson Pipe Co.
  Kerr Engine Co.

Ventilating & Heating Apparatus
  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Vacuum Cleaners
  Tuec Company

Varnishes—Insulating
  Standard Underground Cable Co. of Canada, Limited

Waterproofing
  Cabot Inc., Samuel
  Can. H. M. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Ceresit Waterproofing Co.
  Elaterite Paint Co.
  Pinchin, Johnson & Co.

Water Softeners and Filters
  American Water Softener

Water Turbines
  Canadian Boving Co.
  Escher Wyss & Co.
  Hamilton Mfg. Co., Wm.
  McDougall Caledonian Iron Wks.

Wire
  Canada Wire & Cable Co.
  Standard Underground Cable Co. of Canada, Limited

Wires and Cables
  Royce Limited

Wire Guards and Screens
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Wire Rope
  Canada Wire & Cable Co.
  Greening Wire Co., B.
  Smith, Thos. & Wm.
  Steel Co. of Canada

Wood Turnings
  Automatic Wood Box & Turning Company

"PIONEER" ASPHALTS

"PIONEER" Highest Quality ASPHALTS
TRADE MARK

The 16 year record of "PIONEER" ASPHALTS is the best assurance an Engineer can have as to their efficiency, permanency and economy. Specify "PIONEER" ASPHALTS

For Asphalt Macadam Roads, Asphaltic Concrete, Sheet Asphalt Paving—and Filler for Brick and Block Pavements

and results will be highly satisfactory. "PIONEER" ASPHALTS are 99.5 per cent. pure bitumen. They are waterproof and weatherproof. Can be used for all purposes where an asphalt can be used.

Write for Specifications

THE CANADIAN MINERAL RUBBER CO., Ltd.
Canadian Express Building, MONTREAL 503 Canada Building, WINNIPEG

Tarvia

Preserves Roads
Prevents Dust~

Foundry Street, Waterloo, Ont., Constructed with Tarvia Modern Pavement

Tarvia at Waterloo, Ont.

The illustration shows a Tarvia Pavement which is automobile-proof, waterproof, frost-proof and dustless. Its maintenance cost is trifling and it will last for many years without serious deterioration. It will prove cheaper than to maintain an ordinary macadam road.

The road is bonded for several inches in depth with Tarvia X, the toughest and most adhesive of all bitumens. The Tarvia was applied during the work of construction, layer by layer, filling all the voids and enclosing the stone in a tough, plastic matrix. That is the way to build roads that will last under modern traffic. It is a method which has been amply tested and thoroughly worked out as to costs.

Tarvia is the oldest road-bonding bitumen on the market and is backed by eight years of experience. For less thorough treatments and superficial dust prevention work, there is Tarvia B and Tarvia A. One form of Tarvia or another will solve every macadam road problem, provide dustless low-maintenance surfaces and reduce general road costs.

Booklets on request.

THE PATERSON MANUFACTURING COMPANY, LIMITED
MONTREAL TORONTO WINNIPEG VANCOUVER

THE CARRITTE-PATERSON MANUFACTURING CO., LIMITED
ST. JOHN, N.B. HALIFAX, N.S.

ALPHABETICAL LIST OF ADVERTISERS

Abram Cement Tool Company	75
[illegible]	93
[illegible]	
[illegible]	34
Alsen's American Portland Cement Works	89
[illegible]	92
[illegible]	2
[illegible]	25
[illegible]	97
Anderson & Co., Limited, George	22
[illegible]	91
Armstrong, James C.	104
[illegible]	87
[illegible]	89
[illegible]	92
Baker Company, R. D.	
[illegible]	
Beath & Son, Limited, W. D.	30
Beatty Bros.	
[illegible]	81
[illegible]	78
[illegible]	
[illegible]	21
[illegible]	87
Bowman & Connor	104
Britnell & Company, Limited	98
Browning Engineering Company	
Bremner, Limited, Alex.	103
Brown Hoisting Machinery Company	
Brown Machine Company	98
Brodie & Company, James	94
Buff & Buff Manufacturing Company	93
Cabot, Incorporated, Samuel	35
Campbell, R.	104
Canada Cement Company	3
Canada Foundry Company, Limited	95
Canada Iron Corporation Limited	103
Canada Lifting Jack Company	
Canada Steel Company	25
Canada Wire & Cable Company	25
Canada Wire & Iron Goods Company	88
Canadian Boving Company	26
Canadian Bridge Company	100
Canadian Buffalo Forge Company	106
Canadian Fairbanks-Morse Co., Ltd.	107
Canadian H. W. Johns-Manville Co.	19
Canadian Kellogg Company	35
Canadian Mineral Rubber Company	14
Canadian Office School Furniture Co.	84
Canadian Pipe Company, Limited	80
Canadian Ingersoll-Rand Company	31
Canadian Supply Company	
Ceresit Waterproofing Company	
Chain Belt Company	88
Chipman & Power	104
Clapham & Sons, John	92
Commercial, The	
Conduits Company Limited	103
Consolidated Stone Company	97
Consolidated Plate Glass Company	19
Consumers Gas Company	
Contractors' Supply Company, Ltd.	98
Cook, A. D.	19
Corinthian Stone Company	105
Crown Gypsum Company	22
Crushed Stone Limited	85
Dake Engine Company	103
Dennis Wire & Iron Works Company	77
DesMoines Bridge & Iron Company	101
Dickson Bridge Works	
Dominion Bridge Company	100
Dominion Concrete Company	76
Dominion Creosoting Company	86
Dominion Ornamental Iron Company	96
Dominion Marble Company	19
Dominion Sewer Pipe Company	18
Dominion Steel Castings Company	24
Dominion Wood Pipe Company	88
Don Valley Brick Works	7
Doty Marine Engine & Boiler Co.	23
Douglas-Milligan Company	

Elaterite Paint Company	
Engineering Works of Canada	
Erie Machine Shops	90
Escher Wyss	
Farmer, John T.	104
Ferguson, H. S.	104
Ferranti Electrical Company	12
Foundation Company	
Fuce & Smith	104
Galt Engineering Company, John	104
Galt Stove & Furniture Company	76
Gardner & Saxby	104
Gartshore, John J.	104
Gartshore-Thompson Pipe & Foundry Co.	102
Gaudry & Company, L. H	83
Gibbs & Canning	
Goheen Manufacturing Company	
Goodyear Tire & Rubber Co. of Canada, Ltd.	33
Greening Wire Company, Limited, B.	80
Gurley, W. & L.	93
Hagersville Contracting Company	13
Hancock, Jr., H. Syd.	104
Hamilton Art Glass Co., Ltd.	94
Hamilton Bridge Company	
Hamilton Mfg. Company, Wm.	19
Hamilton Pressed Brick Company	
Harvey, J.	74
Heinicke Company, H. R.	18
Hepburn, John T.	29
Hobbs Manufacturing Company	
Hopkins & Company, F. H.	108
Hotchkiss Lock Metal Form Company	85
Hunt & Company, Robert W.	104
Improved Equipment Company	
Imperial Wire & Cable Company	107
Inglis Company, John	21
International Marine Signal Co.	35-92
Jamieson Lime Company	
Jenckes Machine Company	2
Jennings & Ross	
Jones & Glassco	
Kennedy, James C.	104
Kerr Engine Company, Limited	79
Koehring Machine Company	88
Laurentian Granite Company	104
Laurie & Lamb	1
Lautz Company	
Lea, R. S.	104
Lecky & Collis	17
Leonard & Sons, E.	85
Linde British Refrigeration Company	
London Concrete Machinery Company	9
Lundy Shovel & Tool Company	99
Luxfer Prism Company	77
MacLean Daily Reports	83
Mahan & Company	
Mannesmann Tube Co.	78
Marsh & Henthorn, Limited	76
McDougall Caledonian Iron Works Co., John	75
McDowall, R.	104
McKinnon Holmes & Company	
McMillan & Sons, W.	
McNeil & Company, William P.	102
Meadows, George B.	35
Metal Shingle & Siding Company	99
Metallic Roofing Company	77
Miller & Company, Geo. M.	84
Missisquoi Marble Co., Ltd.	92
Mitchell Company, Limited, Robert	100
Montreal Locomotive Works Limited	85
Morrison & Company	84
Mussens Limited	4
Myers, Oakley	85

Napanee Iron Works	17
National Bridge Company of Canada	101
National Iron Works Limited	103
National Pipe & Foundry Company	102
Neptune Meter Company	101
Noble, Clarence W.	82
Northwestern Terra Cotta Company	94
Nova Scotia Clay Works	97
Ontario Asphalt Block Co., Ltd.	89
Ontario Sewer Pipe Company	18
Ontario Wind Engine & Pump Co.	85
Ormsby Limited, A. B.	20
Oshawa Interior Fittings Company	97
Owen Sound Iron Works	26
Pacific Coast Pipe Company	1
Paterson Manufacturing Company	15
Pedlar People	
Phoenix Bridge Company	94
Piggott & Company, Thomas	96
Pinchin Johnson & Company	106
Power & Son	84
Provincial Steel Company	24
Queenstown Quarry Company	103
Reid & Brown	104
Rhodes Curry Company, Limited	87
Rogers, Limited, Alfred	11
Roman Stone Company	28
Royce Limited	
Sackville Freestone Company, Limited	81
Sand & Supplies Limited	102
Sarnia Bridge Company, Limited	101
Sawyer Belting Company	13
Sheldons Limited	20
Sheppard, James	
Silcox, A. B.	90
Slack & Company, T.	84
Smart-Turner Machine Company	1
Smith Limited, Thos. & Wm.	
Smyth & Ryan	94
Standard Clay Products Limited	32
Standard Ideal Company	36
Standard Steel Construction Co.	101
Standard Underground Cable Co. of Canada	
Stanley Company, W. F.	
Star Expansion Bolt Company	19
Steel Company of Canada	24
Steel & Radiation	8
Stinson-Reeb Builders' Supply Co.	36
Structural Steel Company	100
Sturtevant Co. of Canada, Ltd., B. F.	91
Taylor, J. & J.	94
Thew-Automatic Shovel Company	23
Tiffin Wagon Company	90
Toledo Wheelbarrow Company	96
Toronto Plate Glass Importing Co.	1-94
Toronto Iron Works	89
Troy Wagon Company	
Trussed Concrete Steel Company	98
Tuec Company	82
Turner, C. A. P.	91
United States Steel Products Co.	27
United Typewriter	
Urschel-Bates Valve Bag Company	
Waterous Engine Works Company	90
Weeks, Arthur L.	104
Welch & Company, H. J.	104
Western Canada Contractor	98
Western Wheeled Scraper Company	13
Wettlaufer Bros.	10
Woodstock Wind Motor Company	32
Wood and Service	104
Wooliscroft & Son, G.	
York Sand & Gravel Company	98

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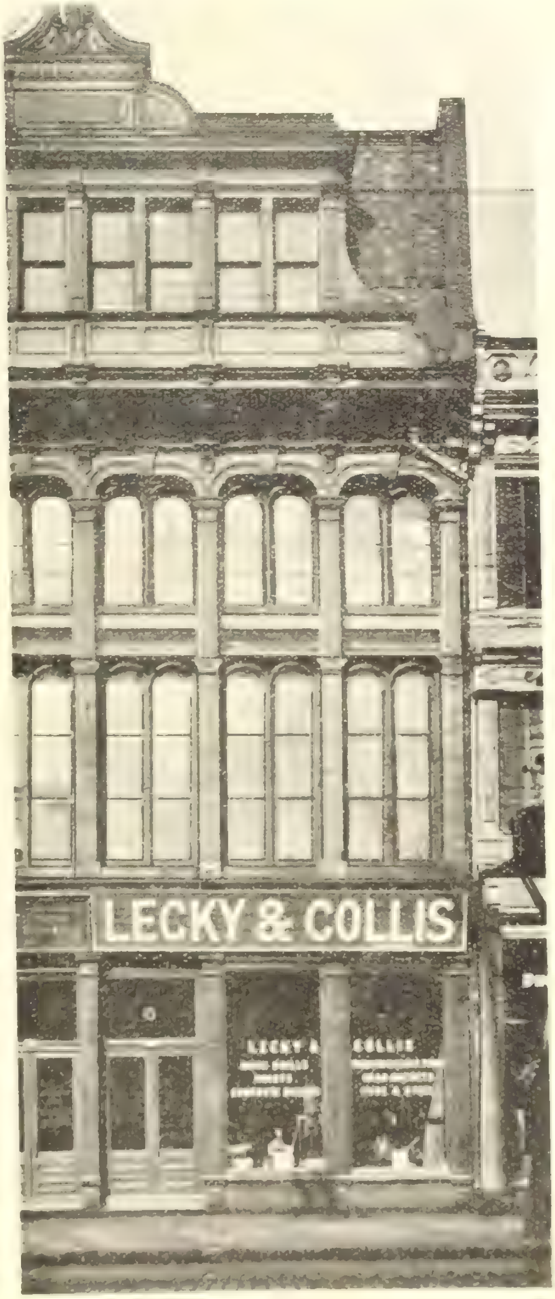

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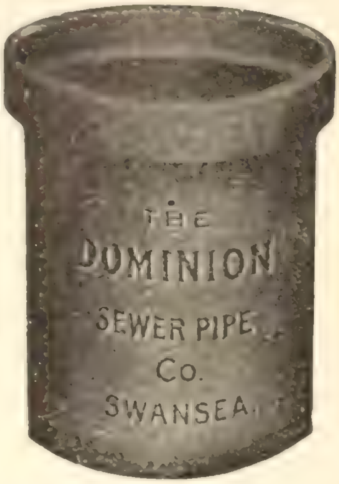

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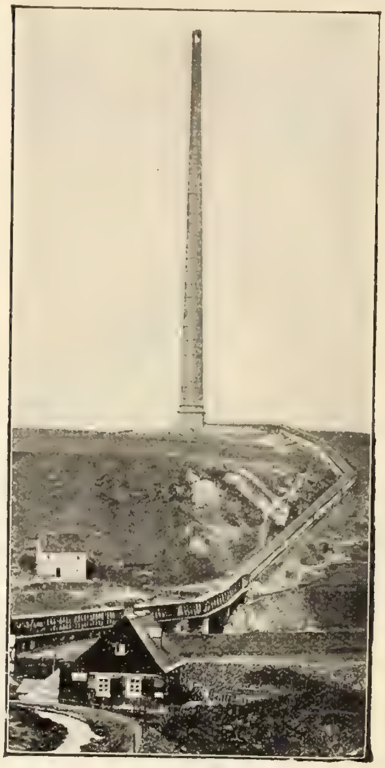

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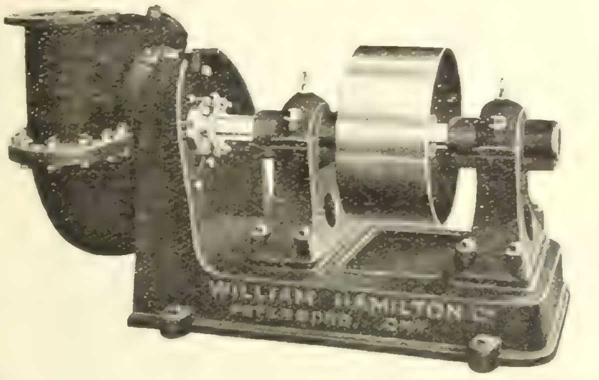

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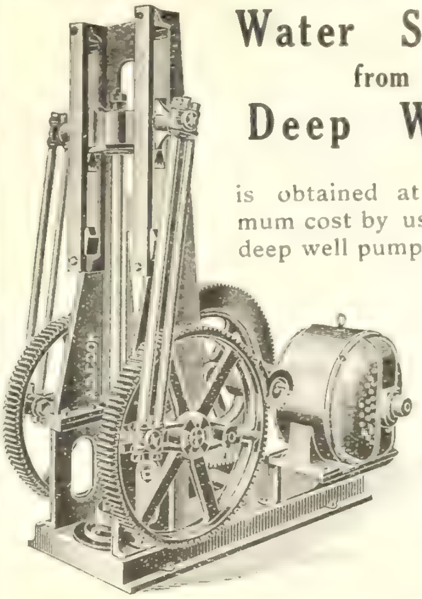

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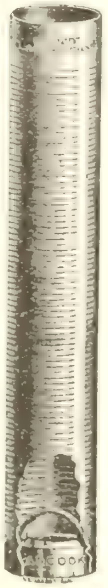

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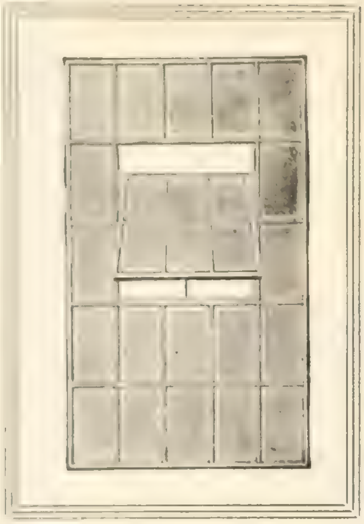

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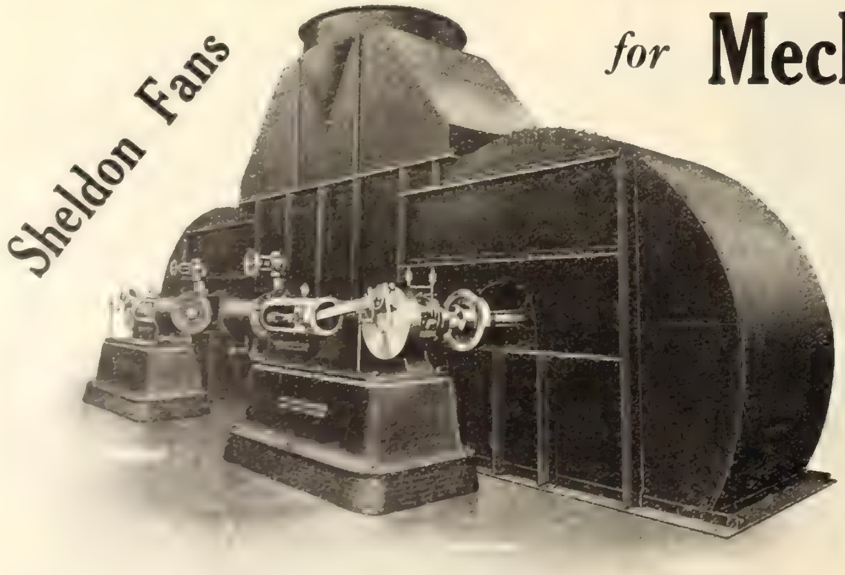

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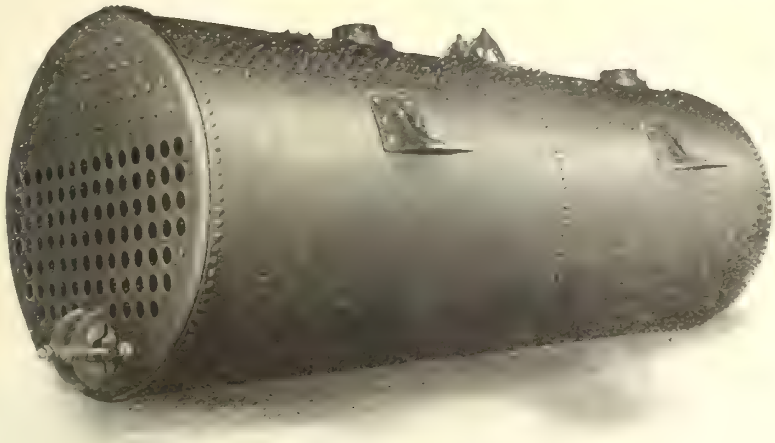

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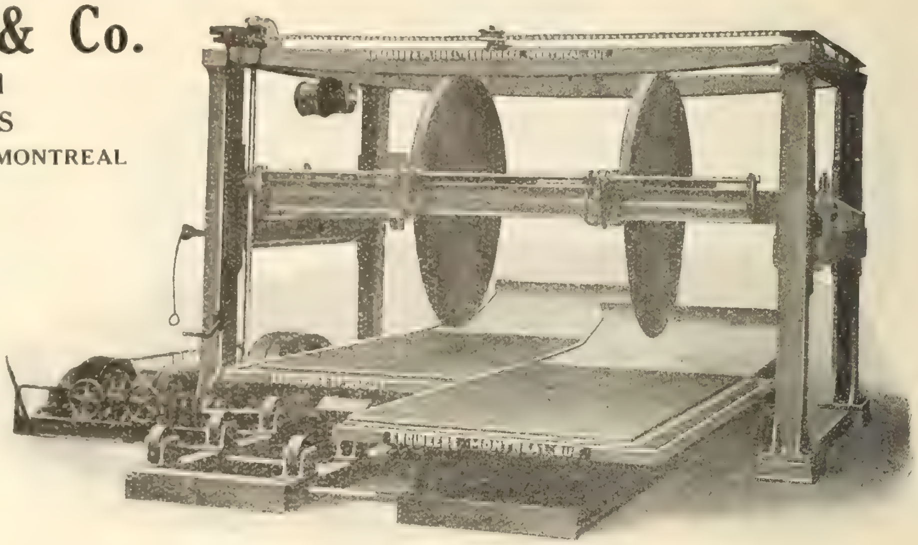

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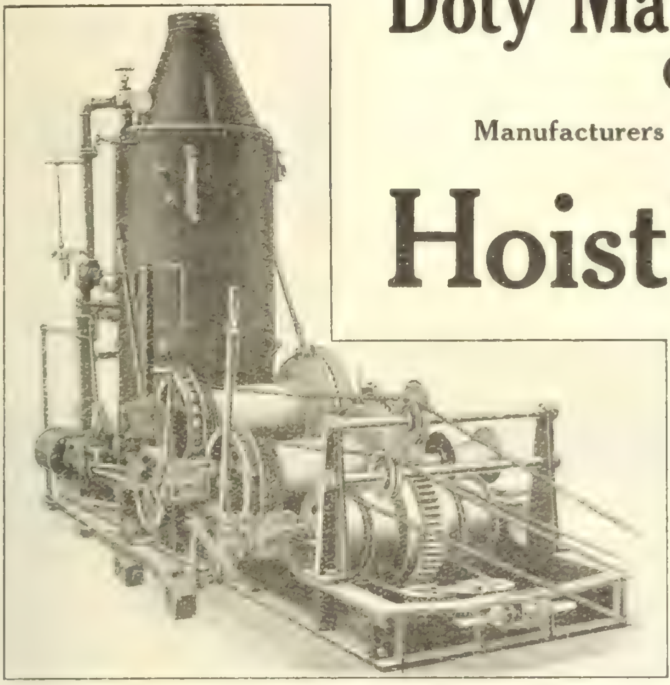

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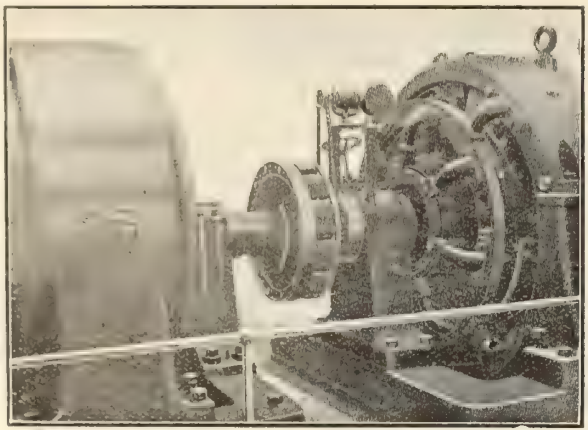

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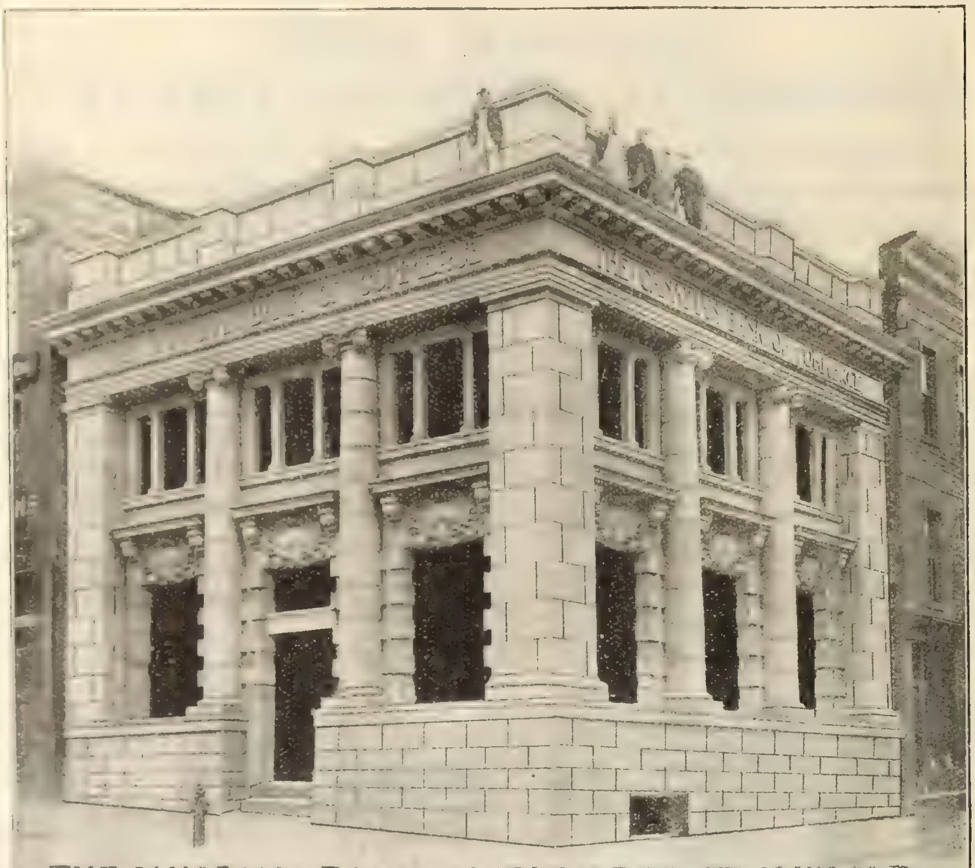

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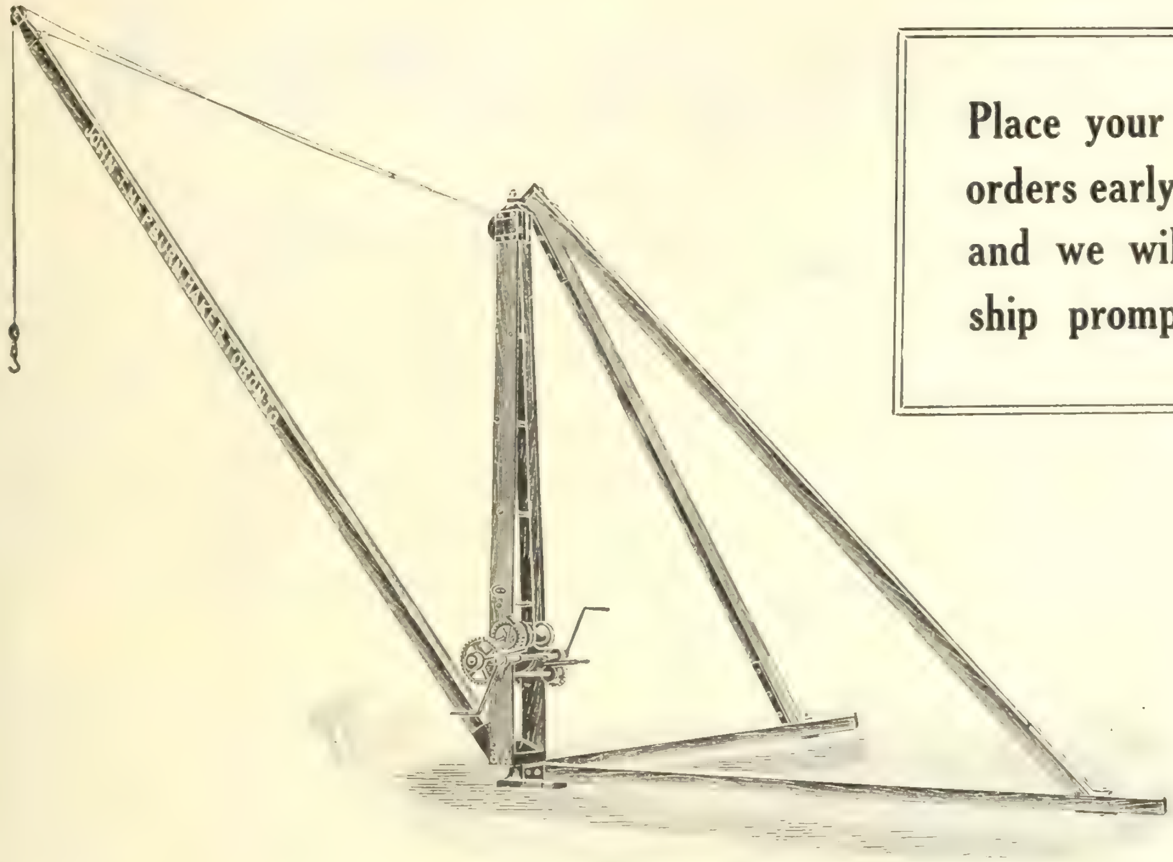
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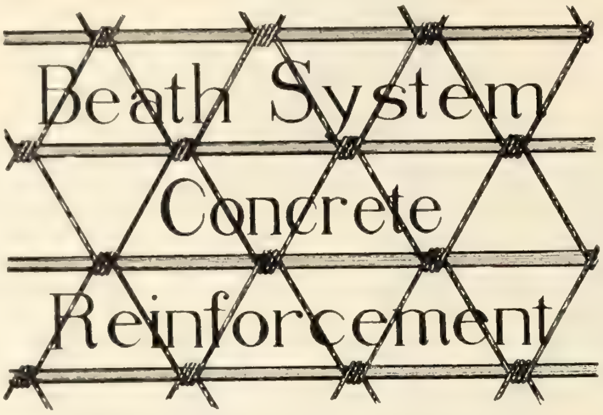

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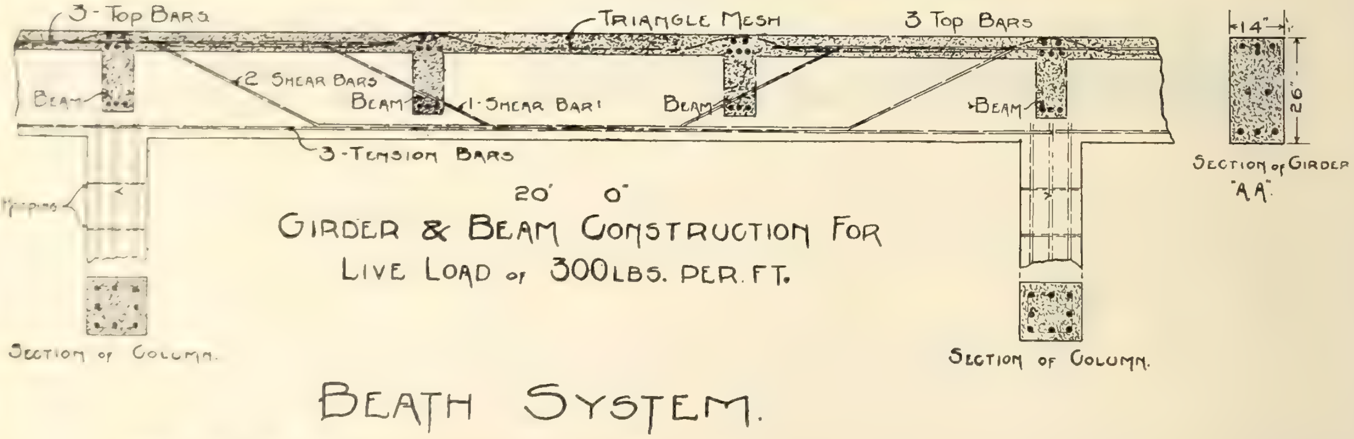

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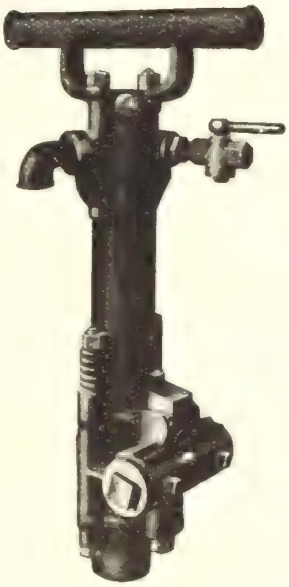

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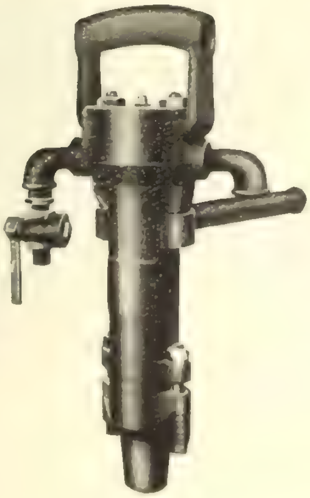

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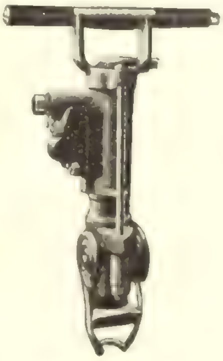

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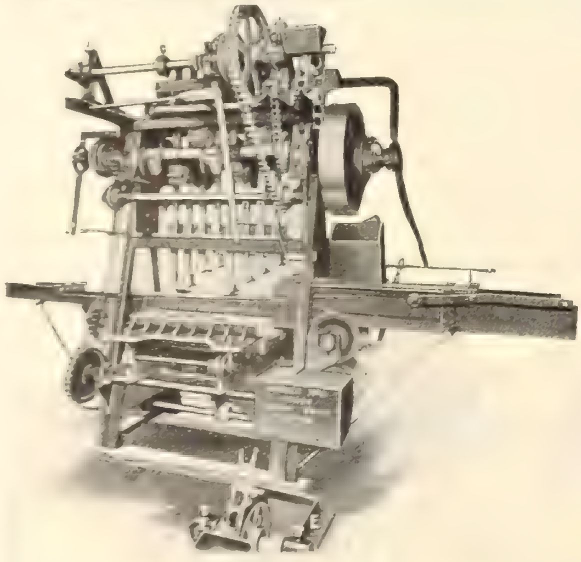

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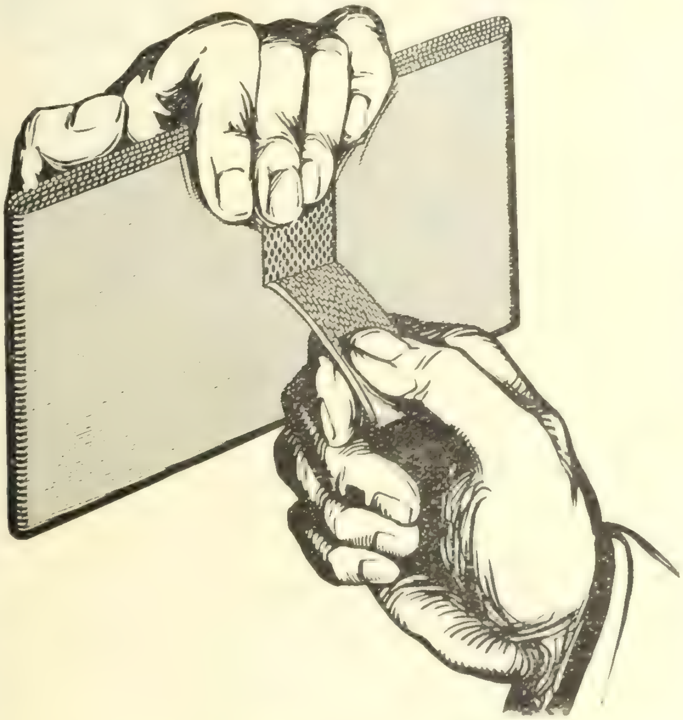

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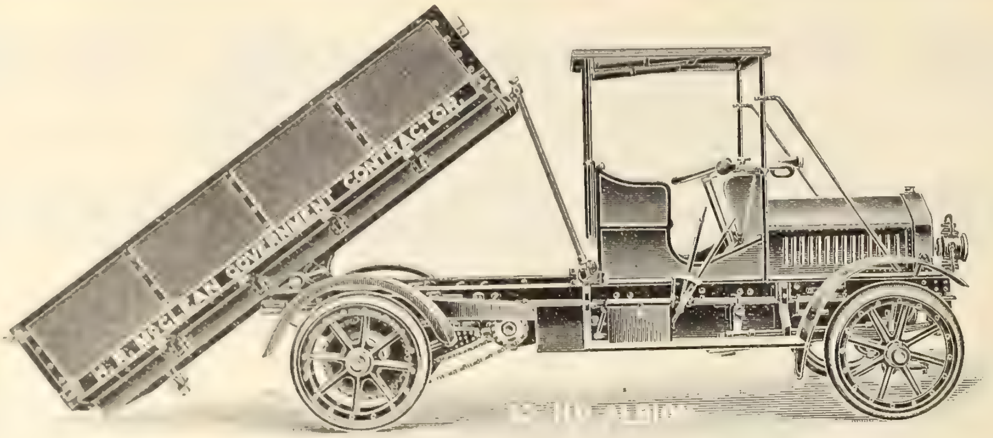
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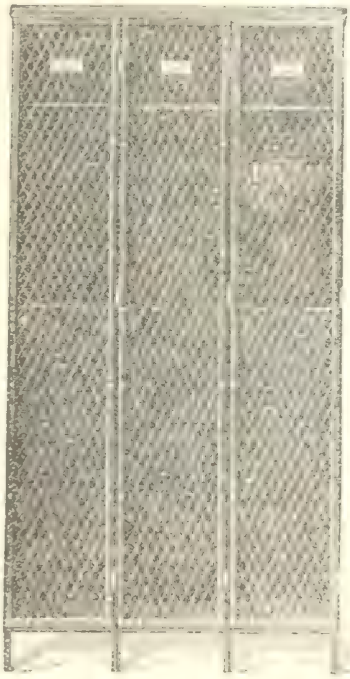

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ESTABLISHED 1886

Contract Record and Engineering Review

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HUGH C. MacLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

HEAD OFFICE - 220 King Street West - TORONTO
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SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 28 February 26, 1913 No. 9

Work and Status of The Canadian Society of Civil Engineers

CONSIDERABLE discussion has arisen out of the editorial article, "The Montreal Convention," published in the February 5th issue of the Contract Record and Engineering Review. The matters discussed in this article appertained to the work of the Canadian Society of Civil Engineers, as indicated at the recent annual meeting of that body in Montreal. A great deal of criticism was forthcoming at the meeting and the article published in our former issue was devoted to a detailed consideration of that criticism: it was pointed out that the Society in its status as the national engineering body of the Dominion must needs recognize its responsibilities; mention was made of the proposal to establish provincial associations within the Society; the subject of employing alien engineers in Canadian enterprises was commented upon; it was suggested that the part in professional affairs now being played by the Society was, perhaps, an insufficient one.

In response to the request of the editors of this journal a number of prominent engineers and members of the Society have submitted their views, and the letters received are published in this issue. The contributions are representative of practically every branch of the engineering field, comprising, as they do, the views of railway, municipal, electrical and consulting engineers. In some of the communications the arguments adduced are as opposite as the poles, but nearly all the writers are agreed that the Society is in need of constructive criticism and active effort.

It would be a task of some magnitude to criticise the various letters in detail; moreover we have no desire to bias the discussion in any way or to detract from the essential interest of the contributions. We shall content ourselves, therefore, with brief mention of a few collective points. Adverting, then, to the need for criticism, it is eloquent that of the opinions received only one can be construed into an absolute defence of the Society, and even that constitutes an apology for the work at headquarters. In regard to the apathy of the general membership, it is significant that a number of contributors who show evidence of having given this matter the most careful consideration are agreed that the lack of achievement on the part of the Society is directly attributable to the lack of interest and responsibility upon the part of the membership. There is an element of truth in this, but at the same time the success or failure of any institution depends upon the administration. If the members give evidence of failing interest, it is surely the part of the Executive to provide a stimulus. A commercial organization may start off with everything in its favor and a practically unlimited field before it, but if the details of the executive work be badly managed it will fall woefully short of expectations. The history of achievement—national, political, social and otherwise—is the history of individual men. Great movements have always required great leaders. And so we cannot think that apathy on the part of the membership can be held responsible for the lack of usefulness charged against the Society. To our mind the question is: Is the Canadian Society of Civil Engineers well organized? Are the administrative heads alive to their responsibilities and fitted to discharge them? It is to the head that we must look for inspiration, not to the units scattered over the length and breadth of Canada. If it be not fair to judge an institution from headquarters, by what measure shall it be estimated? One would hardly make application at the branch office of a railway company for information as to the financial standing, personnel, general constructional schemes and development plans of the whole concern.

An objection to the employment of a permanent secretary is that the Society is already so over-burdened with the support of the various Branches that it cannot afford one. Surely this is a reflection upon the status of the engineering profession in Canada. It is unbelievable that a body of three thousand professional men in a progressive young country like Canada cannot afford to pay the best man in the Dominion to look after their interests. Here again there is a suggestion of inactivity on the part of the executive. The solution is easily found:—**raise the fees.** At the recent convention in Montreal, Mr. H. H. Vaughan submitted a scheme whereby the funds of the Society could be increased twelve per cent. Most of the members were in favor of Mr. Vaughan's proposal, but immediate action was debarred by the by-law requiring a two-thirds majority of the total membership for the passing of such a measure. Such seems to be the fate of all progressive movements in Society work. They are either fettered by by-law or postponed for discussion under some other heading—in which case they quickly become relegated to obscurity.

We must close our observations with a brief comment upon the discussion regarding the employment of alien engineers. So much has been said already that it may appear difficult to make an original observation in this connection. We find that the isolated few who advocate a "broad view" of this matter are those who have had international experience and who hold international interests. We see no reason why [illegible] government should not institute protective measures on behalf of the engineering profession. Within the last month, one of our western cities, that should have afforded an excellent opening for a qualified, energetic young Canadian, appointed an outsider to the position of City Engineer—and the selection was made out of ninety applicants. Assuming that ten per cent. of those who applied were not Britishers, we have eighty-one of our own people deemed incapable of discharging the engineering duties of a city of less than one hundred thousand people. This is only one case out of many. A number of instances were given at the Montreal convention and we know of many more such flagrant examples.

The members of the Canadian Society will be well advised to look to their mettle. Canada is great with opportunities for the engineering profession, but if the affairs of the community be administered by an organization that has no backbone, the field will never provide the harvest that it should.

It is a far call to the next annual meeting and members of the Society are invited to promulgate their views through the columns of this paper. In the minds of some members of the Society there has doubtless arisen a feeling of indecision as to whether or no a discussion of this kind is strictly in accordance with professional ethics. In this connection it may be well to emphasize the fact that in promoting this discussion the Contract Record has in mind only the upbuilding of the Society and the encouragement of such active work as will place it in the undisputed position of Canada's national engineering body. A brief extract from the letter submitted by Mr. W. F. Tye, immediate past president of the Society, may carry some weight:

> "I am sure the Council of the Canadian Society of Civil Engineers do not in the least object to criticism; on the contrary, they welcome it. The members of Council are glad to have any help that others may give them, either by discussion at the annual meeting or by letters addressed to the Society or to the various engineering journals. I believe your effort to obtain and publish the views of members to be a laudable one which can only result in good to the Society."

Engineering Bodies in Civic Affairs

THE importance to the community of engineers' trained men in dealing, as citizens, with the activities in civic matters admits of little discussion. The experience of technically engineering problems which arise in every modern community can be of great value to that community; and to the credit of the engineering professions be it said that their members have been, as a rule, most public-spirited in giving the benefit of their judgment in civic affairs where there has been no possible chance of recompense and no motive other than that of honest desire to be of use to their fellows within the community of which they are a part. And what is true of the action of individuals is doubly true of that of organizations of engineers when the opportunity presents itself for concerted action for public benefit. In view of this, the recent action of the American Institute of Electrical Engineers in dealing with concerted action in local civic affairs is of particular interest.

The Toronto section of the institute was recently invited to participate in a civic matter involving questions of electrical engineering and, being in some doubt as to the procedure, referred the matter to the general board of directors of the institute. From the board of directors the communication got around to the public policy committee, which reported back to the board of directors substantially as follows: That the section should accept the invitation extended to it and co-operate with the civic authorities in the matter in hand, but that its conclusions should not be made public or communicated to its co-workers before they had been acted upon by the general board of directors of the institute. This decision was duly approved and promulgated, and it is to be presumed that the Toronto section will act accordingly in the matter before it.

There are a number of factors involved in this decision that merit attention. The by-laws of the institute provide that no action which may purport to represent the policy or organization of the institute or of any section, shall be published or communicated to any party or parties who are not members of the institute without the approval of the board of directors. The public policy committee, therefore, stood directly on its by-laws and very properly called attention to the fact that it is not always possible to define in advance what are matters of purely local importance; and hence, since the institute should not be locally committed to a position which would be undesirable in another locality, any local report should be submitted to headquarters.

Looking at the matter broadly it will be seen that the question involved is a large one, applying to any technical body which has local organizations. And as regards public interest, the question raised is substantially whether a local engineering body which is part of a greater organization has any right to express its individual opinion on local or, for that matter, other issues. On the one hand lies the danger of local reports contravening the judgment of the engineering organization as a whole, on the other the peril of attempting to muzzle a local body if in dealing with local affairs it speaks freely regarding matters which the main governing body desires to suppress, or in which bodies in other localities might not concur.

Either horn of the dilemma is somewhat dangerous; but after all it seems desirable that local organizations, like local individuals, in order to deal effectively with things in their own communities, should be able to do so without reference to results which might be reached if a similar question were raised elsewhere. It is patent, of course, that a local section cannot give an opinion as that of the national body without the sanction of the governing board and that it should in expressing the opinion of the branch of the local section only. Yet even this action is barred by the public policy committee of the institute.

It is to be presumed that in most instances a reference to the board of directors of the American Institute of Electrical Engineers, or any other similar body, on the part of a local organization would be somewhat perfunctory. In general the governing body would keep hands off, unless there were very strong reasons to the contrary. But the principle proposed is one which will, if generally known, make local civic bodies hesitate in calling on a local organization of engineers for help if that organization is so affiliated that it must pass up its opinions for judgment before rendering them. The natural result will be that if the local engineering body cannot act as such it will be ignored as an organization, and the matters at issue will be referred to a local committee, composed very likely of substantially the same persons, but then able to report quite unhampered by questions of general policy. This will certainly not tend toward strengthening the hand of the organization as such.

The whole matter is a question of local self-government as between the sections of an engineering body and the general organization, which will doubtless in due time take care of itself. The main thing from the civic standpoint is that there should exist in the community the most cordial spirit of co-operation between the technically trained men who can be of service and the body that needs their help. That this does exist all over the country there is the best of reason to believe and no technicalities will in the long run interfere with it.

Many of the bricks used in Prague, Austria, are yet made by hand, both women and men working in the yards. Practically all the buildings are constructed of brick and plastered on the outside. The bricks are larger than those commonly used in the United States and not so well finished, not being used for facing the outside walls. The ordinary building bricks sell at about $8 per thousand. Many new buildings are being erected, which makes the brick business one of the best in the city.

Conventions Are Different Now (?)

What is this?

This is the Head-quart-ers of a Con-ven-tion.

But don't they have a meet-ing?

Oh, yes, that is in prog-ress now up-stairs some-where.

Do they all at-tend the meet-ing?

Bless your heart, no! No one goes but the of-fi-cers and a few oth-ers that wan-der in by mis-take.

What do they do at the meet-ing?

Oh, they read the min-utes of the last meet-ing, some-one reads a ninety-eight page ar-ti-cle, for which no-bod-y gives a "hoot"; some-one else starts an ar-gu-ment and the rest go to sleep; then they wake up, the of-fi-cers re-e-lect themselves, vote the meet-ing the most en-thu-si-ast-ic ever held, and ad-journ.

I think I should like to go to a con-ven-tion.

Of course, we all do.

Canadian Society of Civil Engineers

¶ A number of the more active members of The Canadian Society of Civil Engineers present in the following pages their views concerning the work and status of that body. As explained editorially elsewhere in this issue, the discussion has arisen out of an editorial, entitled, "The Montreal Convention," published in the Contract Record and Engineering Review of February 5. Generally, the suggestions made are of a practical nature and many of them would appear worthy of consideration. In the interests of the Canadian Society in particular and of the engineering profession in general, it is hoped that the discussion will be continued until it assume the form of an active movement, with a definite purpose in view.

The Immediate Past President on the Various Topics

Editor Contract Record:

I have had great pleasure in reading your editorial "The Montreal Convention," in your issue of February 5th.

I am sure the Council of the Canadian Society of Civil Engineers do not in the least object to criticism; on the contrary, they welcome it. The members of Council are glad to have any help that others may give them, either in the discussion at the annual meeting or by letters addressed to the Society or to the various engineering journals. I believe your effort to obtain and publish the views of members to be a laudable one which can only result in good to the Society.

The Council have now under consideration the advisability of the establishment of a provincial section of the Society for British Columbia. So far, I have not formed any decided opinion on the subject. There are some difficulties to be overcome before such a step can be taken First of all, it must be remembered that our Society has a better and more extensive system of branches than any other national society of engineers in the world. We have branches extending from Halifax to Victoria. Our finances are now strained almost to the breaking point to take care of these branches. While this system is not above criticism, it is something, at least, to have established the most extensive branch system in the world.

In British Columbia there are now two branches, Victoria and Vancouver, and it is very likely that Prince Rupert will want one in the near future. If the provincial association were formed, would these be branches of the association or of the parent society? If such an association were formed for British Columbia, it is more than likely that each of the other provinces would also want one. If so, where is the money required for their support to come from? And where is each provincial association to be established? In British Columbia, would it be in Victoria, Vancouver, or Prince Rupert, and how are the local jealousies to be overcome? If in Ontario, would the headquarters of the provincial association be at Toronto, Ottawa, or Kingston, each of which has now a branch? Is a member of the Society located at, say, Fort George in British Columbia, or Kenora in Ontario, to support both the parent society at Montreal, and a provincial association when he may not in years have the opportunity of being at either headquarters? The objections to provincial associations may not be unsurmountable, but at least they require grave consideration, and so far I have an open mind.

There is no doubt that the Society should have a secretary of the calibre of Prof. McLeod, who would give it his whole time, but owing to the amount of money taken to support the branches, it is impossible to have one.

The Council cannot well be accused of being opposed to the interests of the West. The President, Mr. Phelps Johnson, as head of the Dominion Bridge Company, has a very large business in the west, perhaps as large as in the east. Of the three past-presidents, now members of Council, Col. Ruttan has lived for over thirty years at or near Winnipeg; Mr. Rust is now a resident of Victoria; and your correspondent has spent much the greater part of his professional career in the west. Of the three vice-presidents, Mr. Sullivan and Mr. Gamble are western men, and Mr. Vaughan, as head of the mechanical department of the Canadian Pacific Railway, has almost as much to do with western as eastern engineering matters.

In regard to the employment of alien engineers my profession of faith is easily made. While in politics I am a protectionist and am opposed to reciprocity, in engineering I am a free-trader first, last, and all the time. I spent a good many years of my professional career in the United States when one could not get work in Canada, and no one asked or apparently cared what my nationality was. The only thing they wanted to know was whether I could do certain work or not. I believe Canadians should be just as broad, and I certainly believe there are many more Canadians holding good positions and drawing good salaries in the United States than there are Americans doing work in Canada. In my opinion the open market to the south is better for us than a closed market here. Trade unionism as applied to civil engineering never appealed to me in the least. Canada has certainly obtained some very valuable citizens through its employment of alien engineers. It must not be forgotten that part at least of the British Columbia agitation was directed against the employment of a member of the Canadian Society of Civil Engineers born in Canada, but now resident in the United States. Any engineer with the requisite qualifications can become a member of the Canadian Society no matter what may be his nationality or where he may reside, and we cannot very well object to the employment of a member of our own Society.

While these are my own personal opinions, in regard to the employment of alien engineers, as a member of the Council I am quite prepared to help carry out the will of the Society, whatever it may be.

Yours very truly,

W. F. TYE*

Detailed Suggestions for Improvement

Editor Contract Record:

I have read with interest the editorial article in your issue of the 5th inst., entitled, "The Montreal Convention." You have been very fair in your criticism. The question appears to be—as brought out in your editorial and at the Annual Meeting: Is the Canadian Society of Civil Engineers doing all that it should for the engineering profession in Canada? If not, what could be done to make it of more use?

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*President, 1912.

Does it need re-organization? Does the fault that it is not of greater benefit to the profession lie with the Council or members? No one appears to be able to offer a thoroughly practical suggestion as to what should be done. All that one hears is criticism.

As a member who has taken much interest in endeavoring to increase the usefulness of the Society during the last three years in Ottawa, I should like to give, in my opinion, some of the reasons why this body is not of more use to the profession, with some suggestions as to where improvement might be made.

(1).—I do not think that the Council can be blamed for the present state of affairs, as two-thirds of the members do not take sufficient interest in the Society even to vote. It is up to the rank and file to (a) study the by-laws and see if an improvement can be made in a re-organization; (b) attend local meetings, thereby encouraging the reading of papers, becoming acquainted with one another and entering fully into all discussions, whether on a paper or business matters. If the rank and file will show sufficient interest in the Society to attend local meetings and vote on all matters before the Society, the Branch executives and Council will procure papers, give social entertainments, and bring forward enough business matters to make it a great national society.

(2).—The Secretary devotes only a part of his time to the Society, and the time he does spend is not sufficiently paid for. He is giving a great deal of time which his salary does not cover and which is given through his loyalty to the profession and faith in the Society. In my opinion the Secretary should devote all his time to this work and be paid a salary in keeping with the profession he represents. A secretary is the king-pin of the Society, as he has all the detail work to do and is their Business Manager. Our present Secretary deserves the thanks of every member for the time he has devoted to the Society—time for which he will never receive adequate compensation.

(3).—The Council have too much work for an evening meeting once a month. Some means should be taken whereby they can meet oftener, or the local branches (Montreal included) should relieve them of some of their work. If the Council look after the classification of new members and transfers, general improvements and management, they have all that they can undertake. I do not think that a member of Council should be asked to serve on committees not connected with the general management of the Society. There are enough energetic members outside of Council to do this work. Here are a few suggestions for the betterment of the Council: (a) Two-thirds should be young energetic members; (b) no member should serve as a Councillor for more than two terms (six years)—one term preferably; (c) Councillors should be given free transportation to enable them to attend Council—many of them have this, so I think that the railway companies would furnish this gratis for the service the profession is doing for Canada; (d) Councillors should be elected only by the members in the District or Section they represent, and not by all the members, as is now being done; (e) as far as possible a member of Council should previously have been chairman of a Section or Branch; (f) the majority of Council should be composed of [illegible] engineers.

(4).—At the present time there are three elements in the Society: (A) members who believe only in one strong centralization of the Society in Montreal; (B) members who believe in a National Society composed of a federation of Branches or Sections with a head office in Montreal for Council; (C) members who do not care whether there is a National Society or not. Which class is going to succeed in making the Society a big national body? Class A and B are in the minority, so that it is up to Class C to decide between A and B. Can we interest class C in joining one of the other classes? Personally, I think class B is the only way to have a big successful National Society.

(5).—To avoid employing alien engineers, the federal provincial and municipal governments should have laws permitting only the employment of Corporate Members, Juniors and Students of the Canadian Society of Civil Engineers on any of their engineering work. This should also apply to all private corporations, who are subsidized, bonused or protected through duty by any of the above governments. Any qualified engineer or engineering student with a clean record can belong to the Canadian Society of Civil Engineers. This would tend to raise the standard of engineering in government work and increase salaries, as the demand for qualified men would be greater. Our governments should only employ British subjects. A law framed as suggested would keep out a great number of aliens.

(6)—To build up a national society, make it more useful to its members, and increase salaries, all members who employ engineering assistants should see that their assistants belong to the Canadian Society of Civil Engineers, giving the preference to those who belong to the body when hiring assistants, the qualifications being otherwise equal. This would keep out men who were not suited to engineering work, but who get in now owing to their inability to hunt up any other employment. How many members of the Canadian Society of Civil Engineers can say that all men doing engineering work under them belong to the Canadian Society of Civil Engineers? I do not believe that five per cent. could say so. Is this not one of the greatest weaknesses in our Society? And it is a weakness that does not rest with Council, but with the individual member. Who will set the example?

(7)—There should be made some arrangement whereby disputes between members could be settled by arbitrators appointed by Council. Also, arrangements should be made whereby any member could get legal and financial assistance when corporations were attacking his reputation. If our members had the Society behind them, municipalities would give their engineers fairer and better treatment. It would also tend to keep politics out of engineering work.

I have endeavored to lay before you some of my personal ideas on this subject. I expect I am in a small minority. I believe in a national society composed of a federation of branches or sections, with a headquarters' staff in Montreal to attend to the general management and provide a place for Council to meet. I am persuaded that until every member gives the Society his personal attention and assistance (not financially) the Society will never be of such use to the profession, thereby leaving engineering the most poorly-paid profession in Canada.

I trust that those of your readers who take exception to my views will say so through the columns of your paper.

Yours truly,
H. VICTOR BRAYLEY*

Individual Effort Required

Editor Contract Record:

My attention has been drawn to your editorial criticising some phases of the work of the Canadian Society of Civil Engineers, and referring particularly to the recent annual meeting.

[illegible] of the troubles he has experienced are those that never happened. [illegible] serious ones, too, but it has grown up and has assumed [illegible]

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*Secretary, Ottawa Branch.

[illegible] than thanks to the loyal efforts of those who for some years have formed the Council, real progress has been made.

The Society may be suffering from rapid growth, and its present troubles may only be "growing pains." Development usually follows this condition, and I hope that while a moderate growth continues, the main efforts will be in the direction of development.

Canada is developing rapidly and engineers are busy. This may account for the neglect of the membership generally to contribute to the Society's literature. One of the main objects of the Society is to diffuse among its members information on engineering subjects which is transmitted to the Society in the form of papers and discussions.

Let each member ask himself the question—"What have I done for my fellow-engineers in the way of providing subject matter for discussion?" The question usually put is—"What has the Society done for me?" It must be realized that the case is one which demands effort on the part of each individual member if good results are to be obtained from the collective body.

There is no question about the ability of the membership to meet this difficulty, and a little individual effort would accomplish much. I consider this a very important matter, and if we had questions of interest to discuss we should not have to revert to matters which only lead to [illegible].

This is an Engineering Society: its object is to improve engineering and bring engineers closer together for the improvement of all, and to do this co-operation of the membership is of the first importance.

As to the question of foreign engineers coming here and pushing Canadians aside, some of these foreign engineers are members of our own Society, and some, too, have been eminently fitted for the special work they have been called upon to do. I do not think that Canadian employers have any preference for foreign engineers. They are wise enough to try and get the best man they can.

Union is strength. We should unite to make our Society strong. The work cannot be done by the Council alone. Every member has his responsibility, and efforts should be directed not to disintegration and criticism, but rather to centralization of effort with a view to making the Society, not only in name, but in fact, the national engineering organization of Canada.

Let each member do his duty and the Society must succeed. And in so far as the Society succeeds, just so far will the dignity of the engineering profession be recognized by the public.

Truly yours,

HENRY HOLGATE*

Engineers Too Busy for Society Work

Editor Contract Record:

I have read with interest in the February 5th issue of your paper your editorial on the Annual Meeting of the Canadian Society of Civil Engineers at Montreal.

You state that "criticism is undoubtedly a good thing in moderation," and that it was not lacking at the meeting of the Society. To the best of my recollection, this criticism was not greater at the last meeting than at previous meetings of the Society, and the failure of the critics to make good their charges was even more notable than in former years. If, however, criticism were absent, it would argue that the Society were dead and ready for interment. Criticism is to be invited; its chill breath brings life.

I am rather inclined to believe that the error of the critics is that they are mistaken in their premises. New blood is suggested. New blood has been added to the Council for years past, and into the corporate membership year by year. The Council is composed of comparatively young men, individually very active.

I, as a member of the Council for some years, know that the whole work of the Society has been falling heavily on the shoulders of a few. Such trouble as exists is not in the Council; it is inherent in the members themselves, and I shall give what I firmly believe to be the reason for the inactivity complained of.

The Canadian Society of Civil Engineers is, and will be, I trust, the national engineering society of Canada. There are few countries where engineers have a greater task to perform than in this Canada of ours. They are prominent everywhere in the development of the natural resources of this country, but they are so busy, so hampered by the task entrusted to them, that they find little time to devote to the interest of societies—engineering or otherwise. Furthermore, the large area covered by their enterprise of necessity prevents very close connection with the activities of the Society. The branch organizations were instituted with the idea that local interests would be created in the work of the Society, and I would suggest that the Society be not judged by the headquarters section alone, but that a broader view be taken of the work of the Society as a whole.

Yours truly,

L. A. HERDT†

Bylaws Unsatisfactory

Editor Contract Record:

It was a pleasure to note your editorial in the Contract Record of February 5. It is one that for earnest consideration surely commends itself not only to the Council of the Society, but to every member who takes an interest in the affairs of the Society. The third paragraph, as well as the last two paragraphs, of the article, should meet with the universal approval and endorsement of the members.

The annual meeting this year, so far as the social aspect was concerned, reflected credit on the Special Committee having the arrangements in charge, and they earned the thanks of all. On the other hand, it was quite noticeable, more especially to those who had attended many of these annual gatherings, that the business section of the meeting reflected little credit on those responsible for the direct management of the affairs of the Society.

It did not require more than ordinary sense to observe the attempt to take cover made by those in direct charge, when plied with questions bearing on Society matters about which members had a right to know. Some of the replies given were couched in most ambiguous terms; some questions were not even given a reply, and in general, the questioners were virtually classed as "kickers."

At the meeting, one or two of the Council talked on the lines that the presentation of more papers would create the feeling that the Society, after all, was of great use. The majority of the members, however, still appear to think that the one great object of the Society should be to promote the general interests of the civil engineer and uplift him in the eyes of the Canadian public. When this is done the question of bringing in outside engineers will solve itself.

As regards bringing in "new blood": how can this be done under the present system of nominating candidates and under the existing by-laws? Under the latter a member, after having served two or three years on the Council, may be chosen for three years as a vice-president. He may then become president—if he be fortunate enough to get a nomination—and at the end of one year's service may still have three years as a past-president to assist in running the affairs of the Society. New blood comes in slowly under such conditions.

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*Consulting Engineer, Montreal.

†Professor Electrical Engineering, McGill University, Montreal.

An analysis of the list of Councillors for the last ten years shows that eight members have served four years on the Council and one for six years. Ten have served three years and several have been on for two years. This is outside of any service as vice-president or president. In a number of years the local headquarters can only boast of having two or three really active young men on its Council.

With the help of your paper and the other engineering publications these conditions may be bettered in the future. If not, the Canadian Society of Civil Engineers may put out the notice, R. I. P.

Yours very truly,

"AN INTERESTED MEMBER"

Engineers Underpaid

Editor Contract Record:

If I were to offer any adverse criticism of the Canadian Society of Civil Engineers, one might reasonably ask me: "What have you, yourself, done for the Society?" and I should have to answer: "Nothing but pay my dues and occasionally vote on the admission of new members." If I were driven to the wall in an argument about this matter, I should probably turn the tables by asking: "What has the Society done for me?" and the council of the Society might find their reply a puzzle.

Remote as may be my connection with the Society, I am perfectly satisfied to send in my annual contribution so long as I am persuaded that the Society does anything for the betterment of the engineering profession. Along the line of new effort I think that the Society might look to an improvement in the financial conditions under which most of its members have to work. The average salaries paid to engineers in all branches of the profession are ridiculously low; so that unless a man has private means, he must live very quietly and forego social pleasures.

In regard to your remarks concerning the employment of alien engineers, I can only say that I fully endorse them. One hesitates to say too much in this connection for fear of being regarded as a member of that discontented element that exists in every community, but of late there have been many flagrant instances of the employment of outsiders.

Yours truly,

"A WESTERN ENGINEER"

Annual Meetings "Not Worth While"

Editor Contract Record:

In your issue of February 5th, you say editorially:

> (1) The Canadian Society of Civil Engineers has an honorable record, but it has not yet reached that stage where its mandates are final, and if by unwise opposition to western enterprise a division is caused in its ranks, it may lapse into comparative obscurity.
>
> (2) Surely the Canadian Society may properly concern itself with things that are of vital importance to its members.
>
> (3) Old time traditions should give place to enterprise and activity in the day of competition.

I am heartily in accord with the parts which I have quoted. I have attended a number of the annual meetings, and have come away each time more and more convinced that it was not worth while—so much "talkee talkee," and so little done of a useful character. The failure of committees to report is very unsatisfactory to members in active practice who are hoping for uniform working standards, approved by the Society. I am firmly convinced that the time has fully arrived when we should have a uniform code of ethics and a minimum scale of remuneration for persons engaged in different kinds of engineering work, even though the wages or scale of fees did not apply to men on yearly salaries. There may be difficulties in the way, but only difficult things are worth doing; anybody can do the easy things.

"A MEMBER"

Development Along Broader Lines

Editor Contract Record:

While I do not waver in any way in loyalty to the parent society or in my respect for the admirable work accomplished, I think that your criticisms are not at all severe or misplaced. I quite agree with you that the destructive critic is most objectionable, but no fair-minded man can object to a criticism which is both constructive and instructive.

Holding the views I do with regard to the desirability of advancing the interests of the civil engineering profession in general, I welcome anything that will tend towards a stronger body of men able to take their part manfully in the development of our country. In this direction I am sorry to say that the parent society, to all appearances, has been apathetic. They must come out of their shell and endeavor, as you say, "to build up a strong national engineering body equal to Caanda's growing responsibilities." Before long, this body, if properly administered, should be equal to any other engineering body in the world. We have great responsibilities and great possibilities, neither of which must be neglected.

In regard to the employment of alien engineers, I quite agree with your remarks. I have nothing to say against the ability of those who have been brought into this country from the other side of the line, but I do most strongly object to the principle—and to the prevailing opinion in the minds of many who have need of the services of civil engineers—that expert advice and expert service can only be obtained to the south of the international boundary line. We in Canada are quite capable of designing and carrying out any engineering works needed in the development of the Dominion.

Your remark regarding the proposed establishment of provincial associations is a very good one. It is impossible for those living in Montreal to understand or keep in touch with the objects and aspirations of civil engineering bodies located at great distances from headquarters, such as Vancouver and Victoria. I think that if the establishment of a civil engineering section of British Columbia were conceded and a certain amount of autonomy granted, it would not only strengthen the profession in this province, but it would also be a benefit to the parent society.

Yours faithfully,

F. C. GAMBLE*

Disintegration Fatal

Editor Contract Record:

As regards the employment of alien engineers, I am heartily in accord with the suggestions made at the Convention, but it seems to me that there is considerable difficulty in tackling it. During the last twenty-five years, both in England and in South Africa, and generally in British possessions, I have frequently seen the introduction of alien engineers to posts for which a British engineer would have been qualified.

I am not at all in favor of the idea put forth by the British Columbia members of the Canadian Society of Civil Engineers. It seems to me to be introducing an element of provincialism which, I think, would be fatal to the prosperity of the Canadian Society of Civil Engineers; and it must be remembered that we engineers in the other provinces are faced with exactly the same difficulty as those in British Columbia.

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*Vice-President Canadian Society of Civil Engineers; Chief Engineer of Railways for British Columbia.

It seems to me that the only course is for the Council of the Society as a whole to appoint a small committee to make strong representations to the Federal Government and not merely be put off with the stereotyped reply that the matter will have attention.

The Canadian Society of Civil Engineers should stiffen up its back and insist on being recognized as the governing body of the profession in Canada.

Yours faithfully,

ARCHD. CURRIE*

For Discussion at Special Meetings

Editor Contract Record:

It seems to me that an excellent purpose would be served if the matters affecting the Canadian Society of Civil Engineers, discussed editorially in your issue of February 5, were brought forward for open discussion by the various engineering bodies at special meetings convened for that purpose.

Yours very truly,

"TORONTONIAN"

A Plea for the Younger Members

Editor Contract Record:

I read with a great deal of interest your recent editorial on the Annual Meeting of the Canadian Society of Civil Engineers. Your words carry much more weight with me because you were on the ground. You are not one of those, who, while lacking interest to attend, stay at home and launch their criticisms from a distance. Also, to my mind, your criticism is constructive, not destructive—like a great deal that I heard at the convention. I wish to remark on two of your paragraphs for two reasons: firstly, because I heartily agree with your sentiments, and secondly, because I disagree.

To take the disagreement first: regarding the employment of "alien" engineers, I have heard the arguments of the western members and am still of the opinion that there is another side to the matter. Is the tirade against aliens a broad-minded, sincere conviction of what is best for our profession, or is it a local jealousy arising out of one or two isolated cases?

Recently the Dominion Government, seeking advice concerning the future development of Quebec harbor, retained two of the leading habor engineers of England. These two gentlemen investigated and reviewed the entire situation in an impartial manner, absolutely free from any local or political advantage. They have mapped out a course, broad, progressive and at the same time, I believe, in the best interests of Canada at large and Quebec in particular. I wish to ask you, Mr. Editor, if this is not a good policy for any government to take in a case where local bias is so apt to influence even a trained engineer? I think that if Canada is able to profit by the experience of any country we are wise to do so—even though that country be the one that has offended the members from the west.

Your last observation, "It would seem that the Society could do with new blood," meets with my warmest approval, and I believe, with that of a large number of the younger engineers, although modesty may prevent their saying so.

Is not a younger man who attends year after year, paying dues after dues, and sees the same men handling the affairs in the same manner, apt to be disheartened and think that there is no place for him? Take the Library—a very important factor in the Society life. Who benefits from the Library as much as the younger members who cannot yet draw for information on their private collection of books or from their own experience? What, then, would be more logical than to have as members of this committee one or two young men fresh from one of our engineering colleges? Would they not put into it their own enthusiasm concerning books, before it has been dulled by the more prosaic and practical details of engineering practice? I have heard one of the foremost engineers of Canada say that a man is no good to the profession until ten years after graduation. Even if this be true—which I doubt—there is nothing to be gained by absolutely ignoring his existence for these ten years. Rather give the young man a chance to be of use in the affairs of the Society, and it will be a benefit to him as well as to the organization.

Yours truly,

"ONE WHO IS STILL IN THE 'TEN-YEAR' STAGE."

C. P. R. to Expend Sixteen Millions

The appropriation for the work to be carried out on the eastern lines of the Canadian Pacific Railway during the coming season has now been approved by Sir Thomas Shaughnessy, president of the company, and will involve an expenditure of $16,000,000. This sum will not all be spent on new work, but at least ten millions of the amount will be utilized in completing works which were commenced last summer, including a portion of the new Lake Shore line and the extension from St. Johns to Farnham Junction.

The majority of the new work for which appropriations have been made is principally double tracking on various parts of the eastern lines, and this will involve the expenditure of nearly six millions of dollars. The main line from Islington to Guelph Junction on the London sub-division will be double tracked for a distance of thirty miles, which is necessitated by the increase of traffic, and will prove a considerable relief to the congestion on this sub-division. It is contemplated to have the work finished by November. On this stretch there are a few small bridges to be built, but nothing of any great importance. The tenders have been called for, but contracts have not yet been let.

It is proposed to double track portions of the main line between Romford—which is the junction between the main line and the Toronto-Sudbury branch—and Port Arthur, covering a distance of 135 miles. The total distance between these two points is 553 miles. Last summer 75 miles of this line were double-tracked at the points which most facilitated operation of traffic. It is intended to eventually double-track the whole of this long stretch. The intention of the C. P. R. during the coming summer is to carry out the double-tracking of this allotted distance of 135 miles at various points, as was the case last summer, so as to facilitate the operating of trains and the haulage of grain. The lightest portions of work will be completed first in order that as much double track as possible may be put into operation quickly. The heavy work along the north shore of Lake Superior will be carried out later. Surveys are in progress, and while the double-tracking set down to be commenced this summer entails some heavy ballasting operations at various points, yet it is comparatively easy work as compared with that yet to be done. The principal items of heavy work are due to changes of alignment and grading revisions.

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*City Engineer, Westmount, Que.

Another important work to be commenced this year is the double-tracking of a stretch of fifteen miles between Agincourt and North Toronto. Apart from the work of erecting two steel viaducts over the Don Valley the work on this line is by no means heavy.

The other work to be finished this year includes the inter-provincial and James Bay Railway extensions from Kippawa northwards, grade revision on the Soo branch from Algoma to Sudbury and the Lake Shore line from Glen Tay, on which work is well under way, and which is expected to open for traffic by December next.

New Grand Trunk Roundhouse at St. Lambert, Que.

The new roundhouse which is being constructed at St. Lambert, Que., for the Grand Trunk Railway System by the John S. Metcalf Company, is rapidly approaching completion, and will furnish accommodation for housing and repairing 27 locomotives of the largest type.

The structure which as a whole comprises roundhouse, machine shop, boiler house, fan house, offices and stores, casting store, and sundry accessories, is constructed in concrete, steel, brick, and timber, the whole being built on concrete foundations 2 feet 3 inches in thickness, carried down to solid rock, which is found about 2 feet 6 inches below natural ground line.

In addition to the main buildings, there are, of course, the necessary coaling station (a gravity fed plant of 500 tons capacity), sand house, drying plant, water columns, etc. There are many incidental appliances auxiliary to the roundhouse, some of which are of quite new design, and in other cases the erstwhile standard patterns have been improved and brought up to date, including water columns, concrete pits for same, hot wells, and a model sanitary system and lavatory accommodation for the employees.

The difficulties presenting themselves during the course of construction have been many and varied, particularly an influx of water, both on and below the surface, in addition to which practically the whole site has been raised a height of 7 feet by means of a fill, to suit the grade of the St. Lambert yard. All the buildings were designed in the office of the chief engineer, and the work was carried out under the supervision of Mr. J. C. Seyfriend, structural engineer, Mr. McGuigan, Jr., being responsible for the lay-out and grading.

Progress on C.P.R. Montreal-Toronto Line

THE new C. P. R. line between Montreal and Toronto will be ready for fast passenger service by the first of December next. The general contractors are the Dominion Construction Co., of Toronto. The new line extends from Glen Tay, some six miles west of Perth, to Agincourt, 13 miles from Toronto, a distance of 183 miles. Glen Tay is the present western end of the Canadian Pacific Railway, there being a road running from Montreal to that point, a distance of 143 miles, so the total distance from Montreal over the new line will be about 339 miles.

Last month the force engaged on this road reached 3,100 men, and to-day some seventy per cent. of the grading has been finished, there being also no less than twenty-three steam shovels at work at different points on the line. The official announcement is also made that sixty-five per cent of the bridge work has already been done, there being eighty structures of all sizes on the line from Agincourt to Glen-Tay, the most important being the Trenton Viaduct. This viaduct is 1,600 feet in length and 70 feet high, carrying the tracks over the canal, as well as the Canadian Northern and the Bay of Quinte railways. Then comes a structure at Port Hope, 1,700 feet in length and 50 feet high, followed by another at Dixey Creek, 174 miles from Glen Tay, this bridge being 1,000 feet long and 80 feet high; the sub-structure of these bridges is of concrete and the superstructure of steel. The under work will be completed by the first of May, and the bridge companies supplying the steel promise that the superstructures all along the line will be in position by the end of October.

The track laying will be begun at five different points—viz., at Glen-Tay; at Enterprise, where the tracks cross the Bay of Quinte road; at Belleville, at Trenton and at Agincourt, working in some cases both ways from the points just specified. The steel is to be laid down on the C. P. R.'s new Toronto system will be eighty-five pounds to the yard.

This new road is to tap such important places as Whitby, Oshawa, Belleville, Newcastle, Port Hope, Cobourg, Grafton, Colborne, Brighton, Trenton and scores of less important agricultural and business centres, the grades being 0.4 per cent., both ways compensated for curvatures. The maximum curves are four degrees, the average curvatures being twelve degrees per mile. The first seventy-five miles west of Glen Tay are practically all rock work. A portion of the road taps a very fine fruit country. At some points the track will run parallel to those of the Grand Trunk and the Canadian Northern's new Toronto, Montreal and Ottawa line. From a short distance west of Trenton to near Colborne the three systems hug each other for eight or ten miles and then they strike off like a fan.

New Scenic Highway in Alberta

Mayor William Short, of Edmonton, Alta., has suggested a plan for connecting Edmonton with the Jasper Park reservation by a scenic boulevard along the Saskatchewan River, from the eastern boundary of the province to the Rocky Mountains, a distance of about 350 miles, thence southeasterly to the National Park at Banff, approximately 230 miles.

This plan was submitted by Mayor Short at a recent meeting of the Edmonton Park Commission. A committee was appointed to select alternative routes for the highway and prepare a report. The City Council and the Board of Trade of Edmonton will also be invited to assist in this work, and the provincial government will be petitioned to set aside as much land as is required. The Dominion government will also be requested to reserve land in unsurveyed portions of Alberta, between Jasper Park and Banff.

Mayor Short's idea is that the proposed highway, which will be divided into two sections, one consisting of that portion along the river and the other the mountain section, will be a main arterial road, independent of the surveys already made. It is expected that if the plans are carried out this road will be eventually put in such condition as to attract tourists and automobile traffic, for the convenience of which camping places will be built or improved along the road.

We have received a number of pamphlets descriptive of the various products of the Hydrex Felt & Engineering Company, 120 Liberty street, New York. These products comprise waterproof felts, papers, roofing compounds, paints, etc. It is claimed for Hydrex waterproofing felt that it provides absolute protection against electric currents and electrolysis. The Hydrex Company are specialists in structural waterproofing. Samples of their various lines, and full information, will be furnished on request.

Increasing Efficiency of Small Waterworks and Sewage Treatment Plants

By Paul Hansen, Illinois State Water Survey

TO one who has had occasion to visit a large number of small water works and sewage treatment plants the impression received most strongly is the unsystematic, inefficient and generally abysmal manner in which these utilities are operated. The employment on an annual basis of consulting experts to supervise the operation of such plants is therefore urged.

The expert exercises the character of supervision which is herein considered, firstly, through instructions given to the locally employed men regarding their respective functions; secondly, by visiting the works under his supervision at stated intervals, which may be semi-monthly, monthly, or perhaps quarterly, and, thirdly, by the regular review and study of monthly operation reports prepared by the local employees in accordance with methods prescribed by the expert. These services will consume but a matter of of a few days per month, and can, therefore, he secured for about $600 per annum. It may be conservatively stated that when the increased effectiveness, safety and economy which will result through such expert supervision are taken into consideration, the services rendered will be many times the value of the fee.

There should be no overlapping of function between the expert and the local engineer in general practice, for their respective fields are entirely different. On the contrary, there should be a hearty co-operation between them, for the expert generally finds it advantageous to work through and with the general practitioner and the latter should be the first in the community to recognize when the services of an expert are needed.

Moreover, it is a most illogical procedure to employ an expert to design municipal utilities and relegate the operation, which requires thorough knowledge and greater ingenuity, to persons rarely fitted to perform the duties involved.

The advantages to be derived from the expert supervision of waterworks and sewage treatment plants are of three kinds: First, the increase in the efficiency of operation; second, the improvement in detailed design as a result of the experience gained by the designer in connection with operation; and, third, the extension of the activities of consulting experts in a profitable and legitimate way.

Under the head of increased efficiency of operation a subdivision relating to waterworks may be made as follows: (1) Records and accounts, (2) source of supply, (3) purification works, (4) pumping station, and (5) distribution system.

Records and Accounts

The maintenance of good records and accounts lies perhaps at the very basis of securing efficient water works management, since it offers the means whereby the various items of that management may be analyzed from the economic view point. Once the situation has been analyzed or diagnosed, so to speak, the remedy is plain. The ordinary records that should be maintained in connection with water works operation comprise primarily: (1) Measurement of yield from source of supply, (2) quantity of water pumped, (3) head pumped against, (4) quantity of coal used, (5) amount of ash produced, (6) water evaporated in boilers, (7) location and size of mains, (8) records regarding purification works, including analytical control, (9) cut-off valves and hydrants, (10) location and size of house connections, meters, etc., (11) descriptive records of leaks and repairs and various other items that may be warranted by local conditions. The common practice in this connection is to maintain imperfectly measured pumping records only and often not even that.

In connection with water works accounting figures should be so arranged that they will show the cost of the various waterworks activities and also indicate clearly such items as the following: Capital account or expenditures for original construction; maintenance and operation, including such items as fuel, salaries, repairs, replacements, supplies and incidentals; interest on outstanding bonds; expenditures for taxes; amounts paid as dividends; contributions to sinking fund; expenditure for insurance and damages; receipts from special tax levies and sale of stocks and bonds; net receipts from sale of water; net receipts from sale of meters; house connections and miscellaneous. With such records it is possible to make an intelligent analysis of the entire waterworks operation. This analysis when skillfully made will show clearly where economies may be effected and will constitute a substantial foundation upon which to base a schedule of just and reasonable water rates.

Simple and logical as all this may seem, it is a fact that the great majority of small waterworks can state merely the gross amounts received and the gross amounts paid out, and the water rates are copied, parrot-fashion, from neighboring towns. Capital accounts are not thought of and it is rarely that the total net cost of construction during the life of the plant can be given. The profits are generally considered to be the excess of annual receipts over expenditures, and such trifling items as interest on bonds, payments for the retirement of bonds, depreciation, allowances for taxes, contribution to sinking funds, etc., are quite overlooked. There are instances in which a profit is proudly claimed in connection with the operation of municipal plants, whereas a proper analysis of the figures would show an actual loss. On the other side it may be pointed out that municipally owned waterworks rarely credit themselves with rental from fire hydrants and water furnished by so-called free services.

Source of Supply

In the design of small waterworks the ultimate yield of the source of supply is often not taken into consideration with sufficient care. This defect would be remedied by a better knowledge of operating conditions, but even then it frequently happens that unexpectedly rapid growth and other unforeseen conditions result in the shortage of water. This would readily be foreseen by an expert, and extensions would be recommended in due time to avoid any serious result.

In another category belong supplies that originally were of good quality but which, owing to increased density of population and impossibility of protecting the watershed, have become dangerously polluted. There may also be conditions connected with the handling of a water supply which may render it subject to pollution, even though the source of supply be entirely undefiled. Such dangers as these will always be detected by an expert and it would not be necessary to follow present practice and wait for a disastrous epidemic to emphasize the danger before the remedy is applied.

Purification Works

Purification works are perhaps the most neglected part of a small waterworks installation. It seems in this connection almost impossible to secure effective operation without the supervision of an expert. It is becoming more and more the custom at the present time to place large installations in charge of technically trained men, but the small works are left to the tender care of the pump man or the fireman. In operating mechanical filtration plants, for example, the greatest temptation is to omit the use of the coagulant, especially when the raw water is moderately clear. Such practice often gives a water of acceptable appearance but which, when judged from the bacterial standpoint, is of poor quality. Moreover chemical feeding devices are liable to become clogged and get out of order and hence require a certain amount of regular attention. There are innumerable other ways in which unintelligent management may cause a purification works of good design to give poor results.

Efficient operation of water purfication cannot be accomplished unless there are maintained very complete operation records and unless there is maintained regular analytical control. Further than this the records and analytical results require interpretation at the hands of one who has special familiarity with filter design and operation. The expert cannot as a general rule save money on the operation of purification works, but he can without doubt greatly increase the efficiency at minimum cost, and possibly save the community from the calamity of a water born epidemic.

Pumping Station

In pumping stations for small waterworks the machinery is not frequently enough over-hauled and is neglected to such an extent that slippage is often excessively large—50 per cent. is by no means unusual. The weighing of coal and ashes is a rare exception and it is practically impossible to learn anything regarding the performance of the station. In a great many plants the equipment is inadequate, and this fact is not ascertained until some serious breakdown occurs. With expert supervision it is possible to effect great economies and great improvement in the service rendered in connection with pumping station operation by introducing better care of the machinery and boilers and more intelligent attention to duties on the part of pumping station employees.

Distribution System

The distribution system in a neglected condition may prove exceedingly costly. Waste of water may come about through undetected leaks in the mains due to electrolysis or other causes, through unrestricted waste, through the existence of unrecorded service connections and through theft of water. Another result of unintelligent supervision over the distribution system is the incorrect extension of the mains. Often there are introduced unnecessary dead ends and it is common to use pipe too small to permit of adequate fire protection.

Metering is now recognized as one of the greatest means of preventing waste. Furthermore, metering places the sale of water on a fair and equitable basis to the consumer. The waste that had resulted from unrestricted use of the water has in many instances caused a failure of the source of supply. It also necessitates increased capacity of the pumping machinery and the purification works.

Sewage Treatment Plants

The most discouraging experiences are encountered in connection with the operation of municipal sewage treatment plants. Of half a dozen small sewage treatment plants that the writer has visited in the State of Illinois not a single one was producing acceptable results, primarily because of neglect. This condition is no doubt brought about by the fact that sewage purification plants are generally not popular with the community that pays for their installation and maintenance. They are forced upon a community by injured riparian owners in a downstream direction. If such works are built, it seems to be the general policy of a community to provide for their operation at the least possible expense. This in many instances results in total neglect until the community is again stimulated to action by threatened or actual damage suits. A neglected sewage treatment plant cannot be placed in shape in a day, and as a result it becomes necessary to expend large sums of money for overhauling and in part for reconstruction, which might have been avoided if the plant were maintained under regular and intelligent management.

Poor supervision over small sewage treatment plants has led to a tendency on the part of state boards of health and other bureaus having supervision over the installation of such works to demand larger proportions for such works in anticipation of probable neglect and reluctance on the part of communities to increase the size with the growth of population. This, of course, adds materially to the cost and might be avoided if there existed the general practice of maintaining sewage purification plants under the supervision of competent specialists.

Improvements in Design

It is well known that the advantage of a particular detail of design is not demonstrated until the opportunity is afforded for "seeing how it works out." The consulting engineer who designs and supervises the construction of plants usually ceases his connection therewith, just as he is coming to the point where he may see how his designs work out and if he has any curiosity on this point he must make all subsequent visits and investigations at his own expense.

Referring specifically to sewage treatment plans it may be said that there is a great lack of accurate knowledge regarding the behavior of small installations of this character, because of the almost universal tendency to neglect them, and this, in turn, reacts on our knowledge regarding proper design. As a matter of fact a surprisingly large number of small sewage treatment plants are improperly designed and unsuited to the particular service which they must perform. There is a tendency [illegible] to apply experience gained in the operation of large treatment plants because this is the only experience available based upon careful operation to the design of small works and this almost always results in [illegible].

Finally it may be stated that much discredit has been thrown upon the ability of consulting engineers and also upon the arts of water purification and sewage treatment through no other fault than the present practice of divorcing design and construction from operation.

To the individual consulting engineer the possibility of combining design and construction with supervision of operation in the practice of his profession is of great personal advantage. In the first place it would afford him a continuous and regular income, which would greatly assist in the maintenance of his organization. Many consulting engineers are now required when work is slack to dispense with the services of competent assistants upon whose training much time has been spent.

By providing additional revenue from the same projects, supervision over operation permits the consulting engineer to restrict his practice with respect to variety and to expand his practice with respect to a more intimate knowledge of the work within his chosen field. In other words it provides the means whereby an expert may become more expert.

Structural Waterproofing and the Waterproofing Engineer

By J R. Mickle*

ADAPTABLE as concrete is for most classes of building construction, yet an inherent fault—its porosity—has been the means of bringing a new specialist into the field. I refer to the waterproofing engineer. The mission of this specialist, primarily, is to provide means for securing for the architect or engineer watertight or waterproof substructures, and assist in the development of concrete, which must possess all the properties calculated to prevent the attraction of moisture and resist the penetration of water. In addition, his technical knowledge is displayed in suggesting to the engineer methods which must not only be reasonable in cost but executed in harmony with the other features of the work. He must have a knowledge of agents to be introduced into concrete for providing absolute density together with their ultimate effect. The selection of materials alone is not sufficient: he must apply sufficient methods to the construction on hand.

The architect is now consulting freely with this expert in planning his work as a matter of real economy. Unfortunately, the work of the waterproofing engineer is not so apparent, but it is real nevertheless. The initial cost of providing means to safeguard structures against the presence of moisture or water is slight as compared with the subsequent cost in making an operation all that it should be. Often the nature of the construction is such that the absence of proper preventives at the right time has made perfect exclusion or inclusion of water impossible. Take the

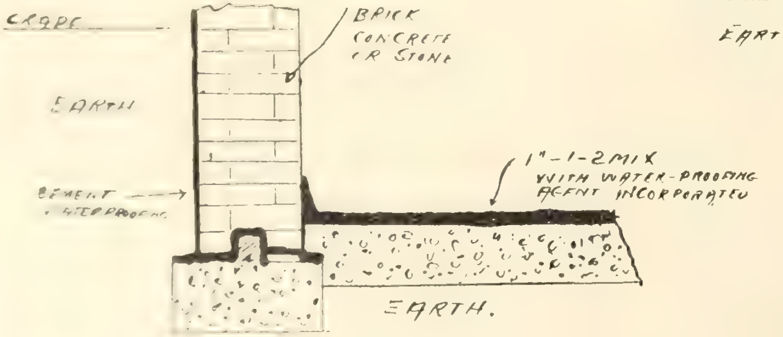

Fig. 1

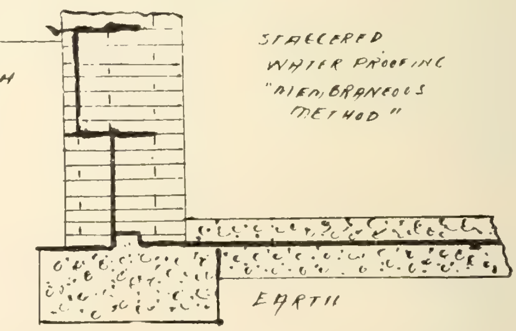

Fig. 3

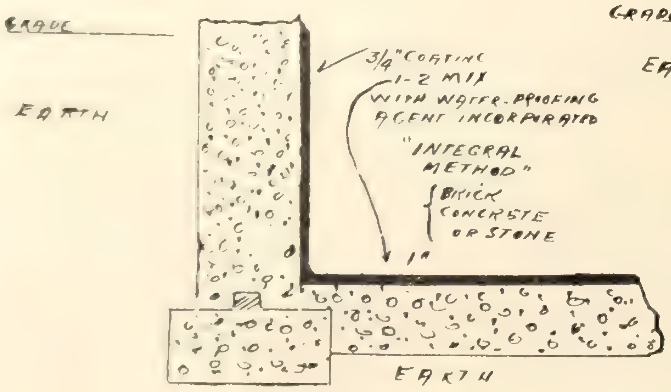

Fig. 2

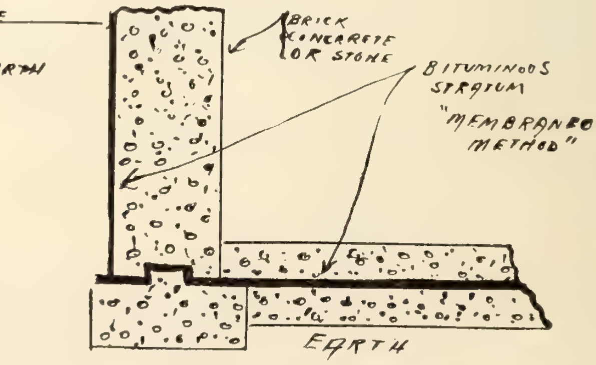

Fig. 4

Foundation sections showing waterproofing schemes case of a structure built upon wet clay soil where in rainy seasons the water has forced its way through the walls and floors of the foundation owing to the porosity of the average concrete. To provide a means for overcoming this trouble—which would be sure and certain—it is necessary to make an interior application of some waterproofing medium over the walls and floors, first taking the precaution of keeping the water away during the progress of the work. This application usually consists of a mixture of cement and sand mixed with some waterproofing compound, the usual mixture of cement and sand being either one to two, or one to three, previously hacking all surfaces to be waterproofed, in order to secure a bond between the waterproofing and the surface to be waterproofed. That this waterproof stratum would have to be continuous is apparent, for obvious reasons:—to excavate around the outside walls and treat the exterior foundation with tar would not be the proper procedure for the reason that the probability of water forcing its way up under the floor by way of the footings is not at all remote. The installation of tile drain on either the inside or outside, near the region of the footings, would be effective only at the points near such drains. However, where the basement floor is built over, say, ½ in. crushed stone, or good cinders, in the original construction, then such a method would be productive of results, providing the drainage system had been installed between the lowest floor level.

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*Waterproofing Engineer, Messrs. Pinchin, Johnson Company, Limited,

The waterproofing engineer knows that clay is both his friend and his enemy, and so he plans to meet the advance of both. In Fig. 1 we have a foundation section showing a method of waterproofing where the waterproofing is not incorporated throughout the concrete mass but applied in a separate operation. Figs. 1 and 2 indicate an installation under the integral method.

Referring again to Fig. 1:—this method is highly useful when building against an adjoining structure where such installation as shown in Fig. 3 is not possible except the waterproofing be staggered through the wall, as shown in Fig. 4. Installation as shown in Fig. 4 does not apply to concrete construction, of course.

The integral method of waterproofing consists of introducing into the concrete mass or applying in a plaster coating an agent whose immediate or ultimate purpose is either the filling of voids or making the presence of voids impossible, by which we can only hope to prevent the absorption and penetration of water. Some compounds for this purpose are comparatively neutral in effect and possess all of these water-repelling properties, acting as void fillers. These compounds are invariably mixed dry before the addition of sand and aggregate. There are other compounds employed in the integral method of construction whose prime purpose is not to fill voids. These seem to have the effect of increasing the colloidal properties of the cement by which the sand and aggregate are brought into closer communion. These latter compounds are usually mixed with the gauging water and are readily distributed to all parts of the mass.

The above compounds have been found very successful when properly used.

Where considerable pressure is to be met, the waterproofing engineer is careful to determine that the amount of concrete used in the foundation construction, especially the floors, will be sufficient to resist the estimated hydrostatic head, bearing in mind that the lifting pressure per head foot of water is approximately 62½ lbs. The resisting strength of a cubic foot of concrete will be reduced by just that amount.

Working against tide water in the construction of the Oliver Street School, New York City, sheet iron pans were interposed between two layers of concrete for the purpose of waterproofing, but in less than two years the bolts joining the steel sections together became loosened and the water pressure was sufficient to lift the upper concrete stratum which constituted the floor. Cutting recesses in the wall at points where the greatest amount of water entered, and digging trenches on the inside of the wall at the footing level, thus leading the water to a sump, has worked out very satisfactorily. These recesses can be concealed by setting in metal lath and plastering upon.

In conclusion, the waterproofing engineer will determine his method and materials from the following conditions: hydrostatic head to be encountered; character of the soil upon which the structure is to be built; relative levels of sewer and lowest points in basement; possibility or impossibility of drainage; class of materials determined for the construction,—whether concrete, brick or stone.

From the above he should be able to provide means productive of bone-dry foundations.

The importance of these questions is realized by the architect and builder of to-day, and it is safe to assert that both are giving this subject more attention than heretofore.

The Strength of Concrete Poles

Tests on reinforced concrete poles were recently conducted by the Carnegie Steel Company at its plant in South Sharon, Pa., with the view of determining the relative cost and strength of that material as compared with wood for such construction. The poles tested were 32 feet long, 10 inches square at the butt and 6 inches square at the top. All corners were beveled and iron steps bent up ¾ inch were inserted in the forms before placing the concrete. The mixture used was 1 part of Universal Portland cement, 2 parts bank sand, passing a ¼ inch screen, and 4 parts crushed limestone, passing a ¾ inch, but retained on a ¼ inch screen. About one barrel of cement ¼ yard of sand and ½ yard stone were used in the construction of each pole.

The reinforcement consisted of four groups of twisted rods at the corners placed not less than ¾ inch from the surface. Each group was made up of one ½ inch rod 32 feet long, two ½ inch rods 24 feet long and two 3-16 inch rods 16 feet long. The reinforcement was thus proportioned to the decreasing stress toward the top of the pole. Sheet steel separators held the reinforcement in place and were cut away to avoid breaking the continuity of the concrete above and below the separator.

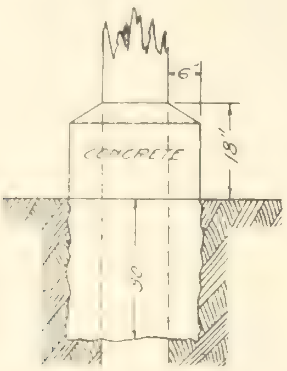
The forms used consisted of an upper and a lower section held together by bolts, the lower being a simple piece while the upper was made up of a series of units beneath which the concrete was forced. The poles thus made weighed about 2500 lb., or five times the weight of a wooden pole of the same length.

The tests were conducted with two concrete poles and a 32 foot chestnut pole under the same conditions. It was found that poles of wood showed practically the same deflection as those of concrete up to 2000 lb., the load being applied at right angles to the pole and at the top. The deformation at 2000 lb. amounted to 7¼ inch this loading being far greater than could ever be experienced in actual use. For deflections of less than 15 in. the concrete pole showed no permanent set. The test on one of the poles was carried to destruction and failure resulted at the point where the 24 foot reinforced rods ended, the concrete being crushed for about 3 feet above and below the break.

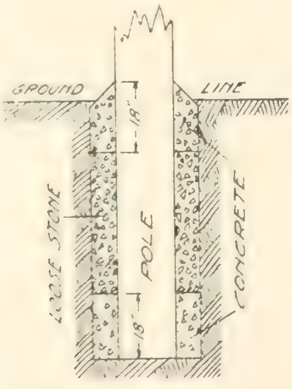
The results obtained showed that the cost of manufacture of such poles should be from $7.50 to $10, as against $4 to $5 for a wooden pole. The cost of wood poles is thus from one-half to two-thirds that of the concrete poles and their life of usefulness is from ten years to a maximum of twenty, whereas the life of a concrete pole is practically unlimited.

Reinforcing Wood Poles at Ground Line

Under certain conditions of soil, drainage, and climate, wooden poles and posts tend to rot at the ground line. Concrete provides a simple and effective method of preventing the trouble, or remedying it if it has not proceeded so far as to render the upright quite useless. The accompanying detail diagrams are self-explanatory, the treatment consisting in setting the poles in a concrete bed or jacketing them with concrete at the ground line so as to protect the parts most liable to attack.



Detail illustrating method adopted by Chicago, Ottawa and Peoria Railway in using concrete to reinforce wood poles at ground line.



Sectional detail of concrete ground-line reinforcement applied to wood poles on line of Chicago, Lake Shore and South Bend Railway.

Provided that labour can be secured, the Quebec Government will expend a million dollars on roads during the coming season. There has hitherto been difficulty in procuring experienced contractors and labourers. Recently the tenders for a new highway between Quebec and Montreal were rejected on account of the high cost. According to the Minister of Agriculture the prices were from 50 to 100 per cent. above what the Government considered reasonable.

Maintenance Engineering in Railroad Work

By A. Clifford Swales, London, Eng.

WATER, in some form or other, is the chief enemy of the maintenance engineer. Drainage should not be forgotten in the early stages of an engineering work. Do not dip a road to get under a railway, or a railway to get under a road, without some thought as to the possibility of draining the depression proposed.

In dealing with steel bridge floors there are three courses open to the designer: (1) To make the floor as open as possible, with no place for water to lodge, and every facility for its getting away quickly; (2) to protect the steelwork floor so thoroughly that water cannot get to it; (3) a compromise course. Even the worst drained bridge, however, does not suffer so much as one over a railway, with a floor so designed that steam and gases from locomotives cannot escape freely.

When a structure fails, it is important that a correct diagnosis should be made. Otherwise the treatment may be all wrong, and may lead to large expenditure, when something quite simple and inexpensive would have met the evil equally well.

One instance is recalled where an intelligent inspector, climbing among the girders of a viaduct 140 ft. high, found that there were signs of movement where the girders rested on the piers. The first thing to find out was whether the girders were moving on the pier, or the pier moving under the girders; and observations extending over some time were necessary to settle this point. There was then no doubt that it was the pier that was moving, and getting increasingly out of plumb. Fortunately, the next pier was an unusually massive one, and it was possible with a system of tie rods attached near the base of it to get hold of the faulty pier near the top, and entirely stop the movement.

Similarly, if one is called upon to deal with an abutment which is bulging and out of plumb, the first thing to find out is, to what the failure is due; is it, for instance, the result of (1) bad foundations? (2) of colliery workings (and old workings which nobody knows much about are sometimes very troublesome)? (3) of excessive pressure from swelling clay or defective drainage behind? or (4) of imperfect building and want of proper bond, or sufficient section in the wall itself? The treatment will entirely depend on the diagnosis. For instance it would simply be waste of money to rebuild or reface if colliery workings were the cause of the trouble, unless indeed the settlement due to them had quite ceased.

In the design of new works the consideration of the likelihood of future alteration has a bearing on the materials to be used. If it is likely to come soon, one does not build with the same solidity adopted if the structure is to be one of real permanence. In designing bridge work, some of our predecessors in days gone by have added large margins to the calculated strengths of their structures, remembering the effect of corrosion and the tendency to increase the weights of locomotives, etc. We are now reaping the benefit of this liberal policy; for had things been calculated more closely, our maintenance expenditure would now be largely increased.

Eight Storey Office Building at Vancouver

THE accompanying illustration shows the handsome eight-storey structure recently erected for the North West Canada Trust Company, Limited, on Richards street, Vancouver, at a cost of approximately $120,000. A record for fast construction work was established on this building, the actual working time taken for the erection of the reinforced concrete frame being 55 days. The entire building was completed in five and one-third months. The dimensions are 55 by 78 feet. The structure is faced with buff brick, terra cotta and stone, with granite base, and concrete coping finished with terra cotta.

North West Canada Trust Building, Vancouver

The ground floor is occupied by the Trust Company, and the upper seven storeys are divided into large offices. Quarter sawed oak trimmings are used on the ground floor and birch on the upper floors. Two combination elevators have been installed. These are so constructed that at night, by the simple expedient of throwing a switch, they run automatically on the "push button" plan. The contract for this building was carried out by the Dominion Construction Supply Company, Limited. Messrs. J. P. Matheson & Sons prepared the plans.

Five narrow gauge gasoline cars for the Queensland Government Railways in Australia, said to be the first narrow gauge motor cars ever built, were recently completed and shipped by the McKeen Motor Car Company, of Omaha, according to the "Railway and Engineering Review." The car bodies are 59 ft. long, all steel, and the cars weigh 39 tons each. Each car has an engine room in front, 15½ ft. long, followed by a small smoking compartment, seating fourteen. The main passenger compartment is about 31½ ft. long, with a seating capacity of fifty-five. Entrance is through side doors between the main and smoking compartments, with steps covered by trap doors. The engines have six cylinders and are of 200 h.p. The trucks are designed to allow the cars to go around the sharpest curves on city railways. The cars were completely dismantled before shipping, the manufacturers sending an expert to superintend their re-erection in the railway company's shops in Australia.

Insulating concrete roofs to prevent condensation beneath them is required in certain classes of structures, such as paper mills. According to Mr. W. H. Ham, of Messrs. French & Hubbard, of Boston, a cheap and efficient method of insulating is by the use of a porous concrete made up of screened cinders and cement. A mixture of this kind that has given satisfactory results consists of 1 prt of Portland cement and 10 parts of cleam steam boiler cinders. This should be placed as carefully as possible in order to insure its porosity, and after setting should be troweled over with a flat coat of mortar to give a suitable surface for the roofing material. This type of construction is not unusual, but has been generally used to get slope for roof drainage.

Plans Prepared for New College at Montreal

ON the instructions of the Board of Directors of the Wesleyan College, Montreal, Ross and MacDonald, Montreal, have prepared plans for a new college, at the corner of University and Milton Streets, on the site of the present building. The estimated cost is $175,000. The new structure is to be constructed of Montreal limestone for the basement, grey pressed brick with Indiana limestone window and door trimmings for the super-structure, and of fireproof construction throughout. There will be five storeys, including a high basement.

The main entrance, from University street, will lead to a reception hall, which communicates directly with the reception room, principal's study, library and dining room, on the main floor. The dining room and library can be used together when desired for convocation and similar purposes.

The three upper floors will be devoted to the use of students for their bedrooms. There will also be a large common or social room for their use. The basement will include the laundry, gymnasium, with showers, etc., main kitchen, janitor's quarters, and other necessary facilities.

The principal's residence will be included in the building, having convenient and private communication with the college quarters, without in any way seeming a part of it, having a separate entrance from University street. It is intended that the building shall be built of the best, and as far as possible, with [illegible] materials, without unnecessary elaboration

Proposed Weslyan Theological College, Montreal

Asphalt Block Street and Track Paving

Considerations Which Led to the Selection of This Type at Oshawa, Ont.—Interesting Cost Data—Practical Points in Discussion

AT the last monthly meeting of the Canadian Society of Civil Engineers, Montreal, Mr. Frank Chapwell, town engineer of Oshawa, Ont., read a paper on "Street and Railway Track Paving With Asphalt Block in a Suburban Town," of which a copious extract is given below.

It is possible that few Ontario towns have labored under more adverse conditions to secure a permanent pavement than has been the case with the Town of Oshawa. It is certain that but few towns had greater need of pavement. Oshawa is a thriving manufacturing town, 34 miles east of Toronto and within four miles of Lake Ontario. The centre of the town lies in a hollow in what is said was formerly a cedar swamp. While excavating for a catch basin, a row of logs side by side—a relic of an old corduroy road—was found, six feet below the surface of the present street. This fact alone would suggest the difficult nature of the soil to be contended with. Then again, the street railway company in Oshawa, operate under a Dominion Government charter granted them about seventeen years ago. By reason of the looseness of agreements and by-laws drawn up between them and the town at that time, the street railway company are not obliged to pave between their tracks or pay any proportion of the cost of such paving. This refusal of the company to recognize any obligation or necessity on their part of paving their right-of-way, was the greatest stumbling block. Special legislation was at last secured, however, permitting the corporation to finance the whole work as a local improvement, the railway company agreeing to relay its track to conform to the new grade established, and further agreeing to pay a portion (amounting to only about 65 per cent.), of the extra cost incurred in placing concrete under the ties. This percentage, moreover, was to be made payable over a period of twenty years. It might be well to state here that railway companies, making overtures to pass over the streets of Oshawa now, are not allowed to slip easily through, but on the contrary have to face and commit themselves to the most binding legal documents it is possible to execute.

Ineconomy of Cheap Ideas

The selection of a pavement had again and again been discussed. One year the cheapness of construction of macadam road proved an attraction, but after a short strip had been constructed upon one of the main residential streets, it was found to be so dusty in summer and so muddy in the spring and fall of the year as to preclude is usefulness in the business portion of the town. The desirability of a plain concrete pavement was then discussed, mainly because of its reported cheapness. The poor economy of these cheap ideas are the biggest drawbacks to communities in the transitory stage from village to town, and from town to city. While the concrete pavement in this instance would have been an interesting experiment, it was, however, voted down by the people immediately concerned. The asphalt block pavement upon a concrete base was finally chosen after the mature deliberation of all parties. A sheet asphalt pavement is beyond the reach of a small town because of the expensive plant necessary at all times to handle the construction or repairs which might be required. Each asphalt block, however, may be regarded as an asphalt pavement in miniature, its composition and manufacture approaching to a considerable extent that of sheet asphalt. When well laid, the blocks, while possessing many of the desirable qualities lack one extremely undesirable feature of sheet asphalt, namely, local creeping.

The streets to be paved in Oshawa, were the two main thoroughfares, which intersect each other at right angles in the centre of the town. The street railway track lies along both streets. In order that the contractors might have every facility for carrying their work to a successful issue, the work was divided into four blocks or sections, and all adjacent street intersections were closed to traffic while any particular section was being constructed. In each case the work was started at the extreme end of a section and progress was made towards the centre—known locally as the four corners. The traffic was thus but little inconvenienced, for while the last portion was being completed in the centre, the other streets and intersection were open for traffic. Moreover, by closing the street against traffic of any kind, it was possible to make a more satisfactory job of the track work, as well as giving the road a greater period for setting and seasoning before use. The first step taken in construction was to make all sewer, water and gas connections, even vacant lots being connected. The whole of this work was well filled in and soaked down with water.

Grade stakes were set out on each side of the street and driven to the proposed elevation of top of curb. This was also the new elevation of each rail. In the meantime the track was completely dismantled, and the old ties hauled away, while the rails and angle bars were thrown on the boulevard. Excavation was proceeded with to a sub-grade eight inches below the finished surface of the pavement. In the centre, corresponding with the street allowance a shallow trench, 9 feet 6 inches, wide, was excavated eighteen inches below the finished surface. This would allow eight inches of concrete to be deposited below the ties, and about one foot beyond the ends.

Concrete in the specified proportions of one to nine, but actually nearer one to seven (an alteration necessary on account of the grading of the gravel), was placed in this trench to a depth of six inches. Within twenty-four hours the ties were laid on this and after the rails had been spiked and jointed, were brought to grade with wooden shims, about three or four to the rail. This left a two-inch space to be filled with concrete. Great care had of necessity to be observed, in order to pack the concrete under the ties, and a very wet concrete was used, entirely free from large stones. This was done as it was believed that the ties would be more securely bedded in the concrete than if the whole eight inches had been filled at once. Furthermore, the track was more easily and accurately brought to grade with this two inches of play.

The method of laying the ties and rails and subsequently raising to grade on the first six inch layer of concrete is avoided by contractors because of traversing the work twice with concrete mixers, etc. In over a mile of similar work done later this method was insisted upon, however, by the writer, and is still believed to be a far better plan than to lay the concrete all at once. The rails and ties if graded up to their proper position are so easily disturbed by gravel teams, wheel barrows, etc., while a much longer period is necessary for the setting of such a thickness of concrete—longer than is permissible in street paving work. The second application of concrete was made at the same time that the base was being laid for both sides of the road. The curbs were also prepared at the same time, the base and sides thus being practically monolithic.

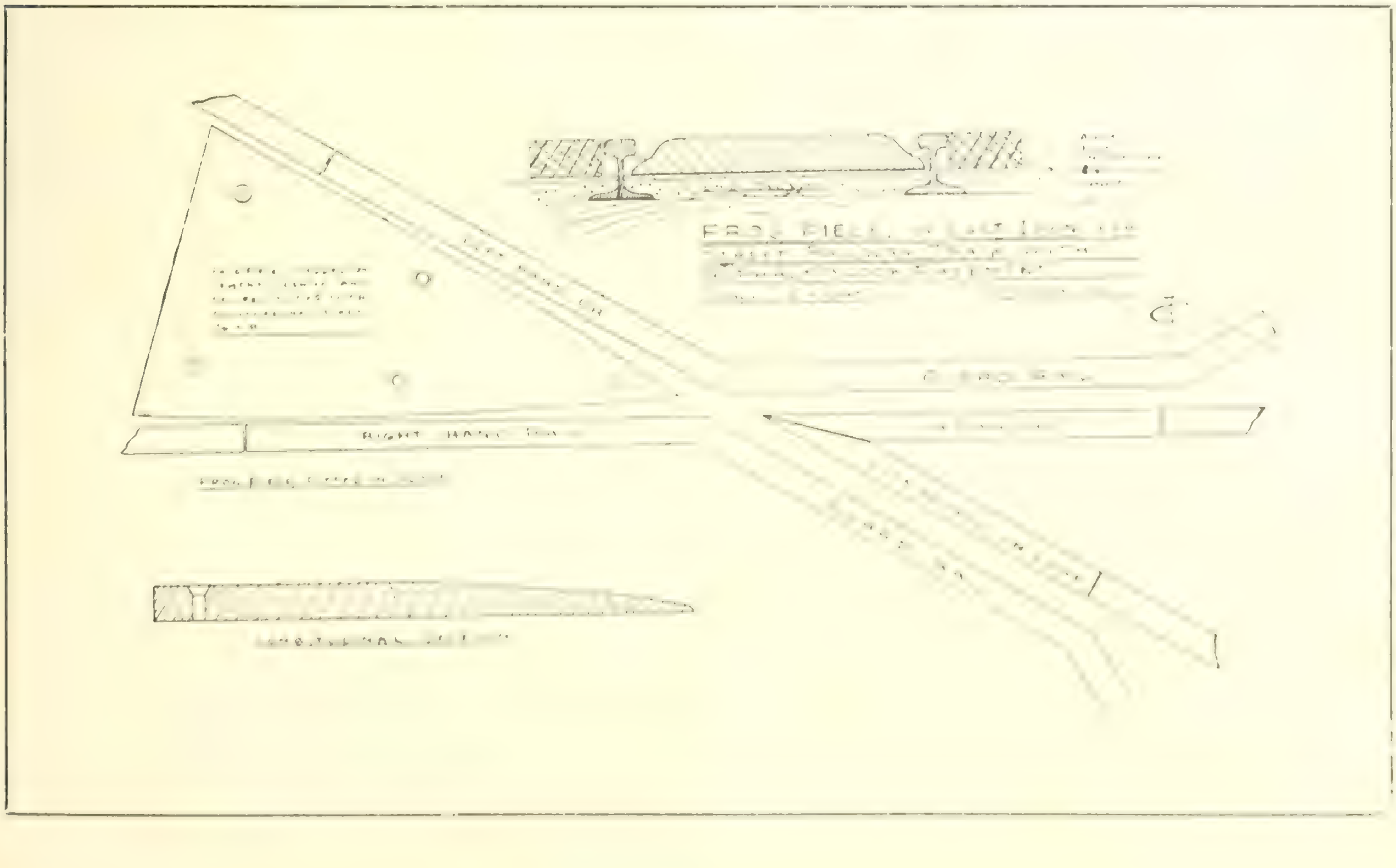
Track Construction

As far as track construction is concerned it is not pretended for one moment that the work described in this paper is by any means ideal. As noted in the preamble, the corporation was largely at the mercy of the railway company, which refused to admit any obligation. So when the company insisted on using old 56-lb. T rails, 4-in. deep, which had been in constant use for nearly twenty years, the only thing to be done was to make the best of such unfavorable material. New ties were provided of Norway pine, but the old angle bars were used. This in particular was a point to which the writer was strongly opposed. For such rails, the writer recommended that the ends of the old rails be cut off and that they be re-drilled. Moreover, a continuous bar joint was to be used. The reason for this was, that in using the old rails and old bars after they had been once dismantled, different bars would probably be connecting other joints. Now these bars during their long service, some 15 or 20 years, would have acquired a "set" in some direction, and this could certainly not be taken out by merely tightening the bolts in re-jointing. However, this was overruled by the company, and the only pieces of track replaced with new material were a few split rails and defective switches. The fallacy of expecting a miscellaneous collection of angle bars to fit an equally miscellaneous quantity of defective rails was amply proven in less than six months after the work was completed. The concrete base was well laid and is an excellent piece of work. It is possible now, however, in less than a year, to stand on a rail joint and cause a perceptible vibration with one's foot. The effect can be imagined, therefore, of street cars hammering on such joints. Even the railroad authorities now admit the poor economy shown in such parsimonious construction, and later work has been done with heavier rails having newly cut ends and new bars, although the continuous bar-joint which the writer believes is absolutely necessary in street railway work is still kept out, only, however, on the score of extra expense. The ties were laid at two foot centres with additional ties thrust under the joints. With the second layer of concrete, the ties became perfectly embedded at the ends, sides, and over the top.

The whole base was now ready for block laying and this took place usually within about three days of the concrete base being laid. A slightly dampened mixture of cement and sand in the proportion of 1 to 3 was distributed over the concrete surface to a uniform thickness of one-half an inch. Between the rails allowance was made so that a crown of half an inch could be given the blocks. The blocks were laid upon this cushion of cement and sand, and then rolled with a heavy hand roller of from three to four tons weight. The surface was then minutely inspected for any imperfectly bedded blocks, which were at once removed with specially shaped tongs, and a small portion of cement cushion placed so that the block would not rock. The blocks were laid between the rails in the same line as the rail. Now this is a nice looking piece of construction and it also has the advantage of being very easy to lay, and furthermore, the number of "bats," or broken blocks, is considerably reduced.

The writer has noticed, however, that where cars have been derailed the tendency is to open up the unbroken course for a considerable distance, should the car wheel strike the longitudinal joint. It is a question that would be well to note, as to whether any greater advantage is gained over this method by the more expensive work of cutting and fitting blocks within the track, at right angles to the line of traffic.

The fact that the blocks were laid in the same line as the rail is another regrettable instance of the overruling of the professional man by the layman. Two and one-half inch blocks are too small for railroad work in the first place. The street car wheels abrade a place for themselves assisted by external traffic to a depth of about one and one-half inches. This then leaves but one inch of blocks to resist any lateral pressure which may be [illegible] to bear [illegible]



[illegible] running [illegible] diagonally. The result is that a block [illegible] when laid in the same line as the rail [illegible] of the [illegible] surface offered by its longer side. As soon as one block is thrown out it is less difficult to loosen others. If the blocks had been laid in this instance [illegible] at right angles to the rail, there would have been at least greater holding surface.

After all blocks had been rolled, examined and found to "bed" properly, the surface was sprayed with water from [illegible]. A cement grout was then prepared in equal proportions of cement and sand. This was poured over the blocks and brushed well into all joints and interstices. As this grout dried out it settled until the joints were only about three parts full. A second application of a stronger grout was then applied, two parts cement to one part sand, and this mixture was brushed into the joints until they were packed full.

As the rails in the track were T rails, a space about two inches wide was left on the inside of each rail to be worked into a groove for the flanges of the car wheels.

A concrete of crushed granite and cement was packed well into this space and shaped with a tool to the required width and depth. This has proven a very satisfactory piece of work and while undoubtedly cheaper, it is, in the opinion of the writer, under certain conditions, even to be preferred to scoria blocks and granite "setts."

With reference to the concrete groove between the blocks and the rail, this too would probably have shown to greater advantage had a thicker block been used, say 3-in. or 4-in. This, of course, was not possible on account of the 4-in. rail in use. There is this about the concrete groove, however, that when abrasion occurs the dust that is produced washes away and the groove has that much less material. To overcome this the writer has since tried on over a mile of road, a groove filler of a mixture of bitumen and broken stone. This is almost a ductile composition and it is possible that in warm weather, at any rate, the bituminous mass will accommodate itself to the groove, and give better results than similarly placed cement.

In connection with turnouts and switches, the triangular space facing the frog gave considerable difficulty. Blocks were in the first place cut and fitted and grouted in. The space was so narrow, however, that the wheels would push them out of place. Concrete of the same consistency as the groove was next tried, being one part cement, one part sand and three parts crushed granite. This, in some instances, lasted no longer than the blocks, while even where car traffic was infrequent, although the life was much longer the result was not satisfactory. A plate of hard grey cast iron, called by the author, a "frog piece," was at last substituted and drilled and spiked to the ties with countersunk spikes. The blocks were paved up to this and the whole cemented in.

This cast iron frog piece is, as far as the writer knows, entirely original and has proven a distinct success. Neither the castings or the adjacent blocks have moved in the least, and this method was adopted at seven different turnouts. Three turnouts were left without such provision and blocks, concrete, etc., were tried out, but without success. These will now be fitted with cast iron plates. The pavement, except for the street railway work, has shown up very satisfactory so far. The blocks appear to be uniform and there are no inequalities in the pavement, the only trouble being with the before-mentioned blocks in the track allowance.

The diamond used in the centre of the town is of an altogether too light and flimsy nature. It consists simply of rails four inches in depth, bolted together on plates at the corners and with cross braces in the centre. This should at least have been made of heavier rails of the "girder" type, although there are cast steel diamonds made which have given great satisfaction, and are undoubtedly to be preferred. The result of using the poor diamond above described has been to loosen all the blocks inside and the blocks for a distance of about four feet outside the rails. Repairs are being made on this work at the time of writing.

All headers at street intersections were made of granite concrete, as for curb, and extended twelve inches beyond and to the full depth of the pavement base. This has proven very satisfactory, although the writer believes that it should be carried further—say two feet beyond the pavement, where the intersecting street is unpaved.

The following data may be of interest:—

Price of gravel, deposited on work by teams at contract price	$1.00 cu. yd.
Price of cement deposited in shacks	1.52 barrel

Superficial Prices

Excavation and grading	.17 sq. yd.
Concrete base (5-in.)	.53 sq. yd.
Blocklaying and ½-in. cushion	.22 sq. yd.
Blocks—teamed on to the work (freight Windsor to Oshawa inclusive)	1.57 sq. yd.

Cubic Yard Prices for Work Under Track

Excavation	.56 cu. yd.
Concrete base	4.68 cu. yd.
Curb and gutter	.56 per lin. ft.
Average cost of catch basins	24.00 each
Total cost per lineal foot of 40 ft. road	14.84
Total cost per lineal foot of 35 ft. road	12.98
Total cost per lineal foot of 30 ft. road	11.12

These measurements are taken from face to face of curb.

This last table of total costs includes paving the street, laying curb and gutter, paving the track allowance, extra concrete under the ties, the dismantling and relaying of the track, together with all catch-basins, etc, required.

The total yardage of the pavement was 14,300 sq. yds. and the total cost including the foregoing incidentals was $47,750.

An Interesting Discussion

Mr. Archibald Currie followed with some extensive notes discussing general problems of street paving, illustrated with diagrams. Mr. Currie brought out many of his points by references to the city of Westmount, of which he is engineer. He spoke in detail of methods of rolling, binding, and scarifying, and discussed the merits of macadam, tar macadam, and other roads, speaking favorably of the work done by the Smith hot mixer in the making of tar macadam roads. These roads had several advantages, being more impervious to water, of longer life, were practically noiseless, dust was reduced to a minimum, and cost of maintenance was less. The initial cost was slightly greater, but the roads lasted longer; the disadvantage was they were inclined to be slippery in frosty weather, but he had got over this by adding more screenings.

Mr. H. H. Vaughan (who presided) spoke of the great importance of roads being well maintained after they were built. It was useless to spend large sums, as they were about to do in the province of Quebec, unless the roads were well looked after.

Mr. E. P. Hannaford, of the engineering department of the Montreal Tramways Company, referred in detail to the troubles the company had experienced in paving their tracks. He was of opinion that for big cities a deeper block than the asphalt block was needed for railway tracks. The company had a lot of trouble owing to the poor foundations of the roads, and they had found very big holes in some places.

Mr. Duchastel, engineer of Outremont, said that the system of road maintenance in the Province of Quebec by the farmers was quite out of date, and it was essential that a better plan be adopted.

Personal Mention

Mr. Charles A. Reeve has been re-appointed building inspector of Maisonneuve, P.Q.

Mr. Edward Hanson has been appointed electrical superintendent of light and power in Saskatoon.

Mr. W. A. Siegner has been appointed assistant engineer of the Stratford division of the Grand Trunk Railway.

Mr. J. Dwight Fiske, of Syracuse, has established a concrete products plant at Calgary. Mr. W. R. Marshall, of Syracuse, will manage the company.

Mr. G. A. Mitchell, hitherto Master of Bridges and Buildings of the Grand Trunk Railway at Toronto, has been promoted to be Superintendent of Bridges and Buildings.

Mr. Charles Watt, formerly superintendent of the Mechanical staff of the Dominion Bridge Company, Lachine, P.Q., was recently presented with a roll top desk on retiring to enter the real estate business.

Mr. A. G. Nosworthy, who has been connected with a leading firm of Montreal architects, has opened an office in the New Birks Building as an architectural engineer, specializing on fireproof construction.

Mr. Robert C. Marshall, manager of the Crown Paving Company, of Calgary, left recently for a combined business and pleasure trip to Vancouver, Seattle, Portland, San Francisco and points in California.

Mr. H. J. Fuller, president of the Canadian Fairbanks-Morse Company, and Mr. F. P. Jones, general manager of the Canada Cement Company, have been elected directors of the Canadian Bank of Commerce.

Mr. A. G. Sangster, electrical superintendent of the city of Calgary, whose term of service expires on March 1, will be succeeded by Mr. Edward Hanson, of Montreal, who has received the appointment at a salary of $3,000 a year.

Mr. James V. Welch, a well known Winnipeg railroad contractor, died at Port Arthur on February 1st. He was born in Italy in 1861, and had lately been engaged on the C. N. R. eastern line. He had lived in Winnipeg for the last thirteen years.

Mr. W. H. Beeman, of Montreal, has been appointed civic commissioner of Sherbrooke, P.Q., with charge of road and outside work. The commissioners in charge of the city's works are Mr. Andrew Sangster, gas and electric, and Mr. Thos. Tremblay, water department.

Mr. G. C. Jones, formerly General Manager of the Central Vermont Railway, has been made vice-president in charge of construction, operation and maintenance, with headquarters at Montreal. Mr. Jones was at different times General Superintendent of the Central Vermont Railway, and Division Superintendent of the Grand Trunk Railway.

Mr. Alvin Schlarbaum, B.A.Sc., has severed his connection with Messrs. Smith, Kerry & Chace as assistant engineer on the Healey Falls development to accept the position of hydro-electric engineer for the Riordan Pulp & Paper Company, Limited, of Hawkesbury and Merritton, Ont. The above company plan to develop [illegible] power on the Rouge River to meet the demand of recent extensions to their plant

Mr George F. MacLeod has been appointed by the Montreal Board of Control engineer in charge of the plans for bridges, tunnels, railway crossings, and railway tracks. The salary is $3,000 per annum. Mr. MacLeod will fill an entirely new position, and will give evidence before the Railway Commission and other bodies. He is a graduate of McGill University, and was a divisional engineer of the Grand Trunk, when he left to take up new duties with the Great Northern in St. Paul, where he remained eight years. In 1909 Mr. McLeod was the engineer in charge of the hydro-electric of Toronto, and for the past six months has been in charge of the filtration plant under construction for the city of Montreal in Point St. Charles.

Engineers' Club of Toronto

FOLLOWING the general annual meeting of the Engineers' Club of Toronto, reported in our issue of February 12, a meeting of the directors was held last week for the election of officers and committees for 1913. The new president is Mr. Edmund Burke, a member of the well-known architectural firm of Messrs. Burke, Horwood & White. Mr. Chas. H. Heys becomes 1st vice-president; Mr. W. A. Bucke, 2nd vice-president, and Col. A. J. Van Nostrand, 3rd vice-president. The executive is completed with the following directors: Messrs. [illegible] Bird, E. T. J. Brandon, Willis Chipman, E. L. Cousins, W. E. Douglas, W. F. Ferrier, A. L. McAllister, James McEvoy, James Milne, G. G. Powell and T. S. Young. The Secretary-Treasurer is Mr. R. B. Wolsey.

Mr. Edmund Burke, the new President of The Engineers' Club of Toronto

The Duke of Connaught recently paid a visit to the Angus Shops of the Canadian Pacific Railway, making an inspection of every department. At the works he was received by Sir Thomas Shaughnessy, president of the C.P.R.; Colonel Lacey; Mr. R. Johnson, general superintendent of the Angus Shops; Messrs. [illegible] Vaughan, assistant to the vice-president, and George Hodge, general superintendent of the Eastern division

A Review of National Building Trade Events and Development*

The year now concluded has established a new record for building construction, not only in [illegible] but throughout the entire Dominion. As the building industry may be accepted as one of the surest barometers of commercial prosperity or depression, Canadian builders and contractors may be permitted some feeling of pardonable pride in their contribution to the permanent assets of the country during the past twelve months.

PROSPECTIVE CONSTRUCTION

The year now entered upon is eloquent with promise of even greater things than the records established by its predecessor. There is only one cloud on the horizon, and that is the shadow of renewed warfare in the Balkans. Happily the area of hostilities has been restricted until now by action of the powers; therein lies the chief ground for hoping that the dangerous spark may yet be prevented from leading to the stupendous explosion of a general European conflict, which would spell financial paralysis and depression for years to come, and whose influence would be keenly felt even in the Dominion, owing to the large investments of foreign capital in this country.

The amount of work in prospect for 1913 is simply astounding in its magnitude. The first estimates for Public Works just tabled in Parliament alone amount to 179 millions, exclusive of later supplementary figures. The proposed expenditure favors no particular section, but is just to East and West alike, the principal construction items being:—

> For harbor improvements: $2,000,000 is included for St. John harbor development; $1,500,000 for Quebec; $2,000,000 for Port Arthur and Fort William; $1,000,000 for the new dry dock at Lauzon, Quebec, and half a million each for harbor improvements at Toronto, Vancouver and Victoria.
>
> For the new terminals of the I. C. R. at Halifax, the estimates provide $2,500,000 to start work.
>
> Other heavy votes inclued $1,000,000 for a new Canadian building in London; $2,000,000 for a departmental building at Ottawa, and $750,000 for new Dominion Government buildings.
>
> For the construction of armouries the appropriation is increased from $100,000 to $250,000, and there is a vote of $100,000 for the new Connaught ranges at Ottawa.

These items are, of course, quite apart from the additional big expenditures on railway construction. Nearly all important cities have some particular big undertaking in view. One of the most striking features is the great awakening in the Maritime Provinces, due in part to the federal development of the eastern ports at St. John and Halifax, but also to the growing consciousness of their valuable inherent natural resources. The East has too long been passed by; large purchases of Halifax realty were completed only last week by a big Montreal syndicate; and it can be safely assumed that many millions will be there expended during the next five years. In Ottawa will be commenced the magnificent new Departmental Building. In Quebec and Montreal vast sums will be devoted to Terminal developments. Toronto is to have its $2,400,000 record 20 storey skyscraper for the Royal Bank. The giant U.S. Steel Corporation has plans for a peaceful invasion of Canada, and is reported to contemplate a 25 million dollar expenditure for plant in the vicinity of Windsor, N.S., besides establishment of minor plants in Moose Jaw, under the title of Metal Specialties Limited, and M. J. Engineering Co. So much for a rapid review of construction. We will now turn to the work of the Association:

ORGANIZATION OF PROVINCIAL ASSOCIATIONS

The value of co-operation between the different exchanges in any one Province was realized long ago by your Secretary, when at the Winnipeg Convention he strongly advocated the formation of Provincial Exchanges to deal with purely Provincial matters, as local conditions and local legislative powers varied in each particular Province. At that Convention a new by-law was drawn and approved, recommending such Provincial bodies still continuing under the jurisdiction of the National Body, and thereupon was organized the first Provincial Association, that of Alberta.

At the last Annual Convention in Toronto the Ontario Provincial Association was formed, and during the past year a similar association has been formed for the Province of Saskatchewan. In fact the whole idea of the Canadian National Association was based upon the elastic constitution of the political system of Canada, wherein the combination of federal, provincial and local government allows free play and liberty to meet all possible local conditions—and up to the present time this is without question the best constitution that the wit of man has yet framed. Already the Exchanges of Saskatchewan, Alberta and Ontario have learnt what the results may be when all work together. There are a number of reasons why a Provincial body can accomplish much that would be impossible for the Exchanges to attain while working separately or singly.

Your Secretary desires to refer at this juncture to the rumour stated in certain trade journals that an attempt would probably be made at Calgary to break up the National Association into "East" and "West." I would respectfully submit that such action would be deplorable, as the Association would then cease to be "National."

The alleged anatagonism between the interests of the East and West is far more apparent than real, and should be regarded with some suspicion as being rather a political catch-word than as evidencing any real differences between the interests of the two. Those underlying causes which militate against the interests of the builder in the West will be found, on careful examination, to be precisely those which militate against the interests of those in the East: and conversely, what benefits the builder in the East will be found to also benefit the builder in the West.

One fruitful source of Western dissatisfaction during the past year was to be found in the shortage of building materials, and transportation facilities; but this should have caused no surprise in view of the unprecedented expenditures in Canada of over 200 millions for buildings alone; and that again is only one branch of the field, as there was corresponding activity in railroad and municipal construction. Nor was this strain upon the sources of supplies confined to Canada; the cement mills of England, Germany and Belgium were equally unable to cope with their foreign orders. As cement has been dragged into politics, it may not be amiss to briefly record a few facts; it was only in 1905 that Canadian production first passed the million dollar mark; in 1911 the record was 5,692,000 barrels, besides increased importations in spite of a general tariff of about 52 cents per barrel. Out of 25 mills operating in 1911, only eleven belonged to the Canada Cement Company, the "trust" of political literature; and out of eight mills since under construction, only one in Quebec belong to it. Five of the active, and three of the proposed mills are in the West, so that it is not a "sectional" industry. The problem of getting cement into the West is not likely to be as acute in 1913 as it was last year, as both the "combine" and the "independent" concerns have made great progress in the way of production and transportation facilities.

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*Abstract of the Annual Report of the Secretary-Treasurer, (Mr. H. J. Lauer) of the Canadian National Association of Builders' Exchanges, prepared for presentation at the Calgary convention.

There has been the usual scarcity of brick, but the facilities are constantly increasing, and the West in this industry also takes a good place, Alberta's position being notable, evidencing that its people have energy as well as a desire for comfort; its actual production in 1911 was upwards of 58 million common, and 15 million pressed brick. Manitoba gives a still greater output. In fact during the last 10-year period for which figures are available at Ottawa, the West gives notable evidence of manufacturing expansion, and we shall probably hear less of "reciprocity" in building and other supplies as the years pass.

LEGISLATIVE MATTERS

"Uniform Contract" and General Conditions.—It is satisfactory to report that after negotiations covering several years with the Architects' Association of Quebec, a Uniform Contract was at last adopted in May, 1912, by that body in conjunction with the Builders' Exchange of Montreal, and is now in general use. Your Secretary understands that Agreements along similar lines have also been arrived at in the Provinces of Ontario and Alberta. The all-important point is that Contractors generally must insist on signing only the approved "uniform" agreements in their respective Provinces.

Duty on Imported Stone.—Attention has already been drawn at the last two conventions in Winnipeg and Toronto, to the unjust conditions under which our Canadian quarrymen, stonecutters and stone-contractors suffer, owing to the one-sided competition of the American limestone and sandstone quarries, due in part to the unequal tariff between the two countries, which has proved totally inadequate to protect our native industry; and in part to unsatisfactory classification of imported stone, and the dumping of United States surplus production on the Canadian market at merely nominal valuation. Subsequent to the Winnipeg Convention ,a delegation representing the quarry interests submitted a widely-signed petition in March, 1911, to the late government, receiving, however, but scant encouragement. The stone-cutting and quarry section of the Montreal Exchange were not disposed to allow the matter to rest there; and with the advent to power of a government pledged to "adequate protection" of basic native industries, went to much trouble and expense in preparing a more elaborate statement of their case in October, 1912, and presented a second and almost universally approved petition to the present government early this year.

Briefly stated, the Canadian tariff on imported stone is 20 per cent "ad valorem" on building stone, "sawn or dressed"; on marble and granite or manufactures thereof, 35 per cent. ad valorem. It is evident that this is only a fictitious protection, as the value placed on the dressed product is purely nominal, being merely "quarry value" in Indiana, Ohio or elsewhere—not 20 per cent. on the prices with which the Canadian product must compete. But the Americans exact "protection which protects" against Canadian stone, and fix this at 50 per cent. on hewn, dressed or polished building stone, and 65 cents specific per cubic foot on marble. Thus at the merely nominal American valuations, our imports of "sawn or dressed" building stone have risen from $[illegible] in 1909 to $[illegible] in 1911; of granite "manufactured" from $[illegible] to $[illegible]; of marble from $[illegible]000 to $186,000; while our exports of all stone have correspondingly dropped from $59,000 to $28,000. Total imports of all stone from the United States were alone valued at $[illegible] in 1911. The only remedy [illegible] duty and a percentage on "value" on all stone other than natural undressed quarry blocks.

This is a matter of vital interest to the West as to the East. Government statistics report over sixty quarries in operation in the West alone. Canada has matchless stone deposits, from the building-stone quarries in Nova Scotia to the marble quarries of British Columbia; yet all over the Dominion to-day the noble buildings going up in every important city and town are only so many advertisements for foreign quarries, and tombstones erected over a native Canadian industry.

Reduction of Cement Duty.—A movement is now on foot to induce the government to permanently reduce the duty on cement by about one-half, to 26 cents per barrel. Canadian mills do not appear to have suffered any serious setback from the temporary remission last summer, and a reduced cost to the consumer would no doubt tend to further popularize the rapidly increasing use of this product.

The Lien Law.—Legislation is rapidly approaching consummation in Alberta, where it is a live question at the moment. Full discussion will be cordially welcomed at the forthcoming convention. There is considerable dissatisfaction at the existing Quebec law in so far as it affects suppliers of material, although in other respects it affords probably the best protection of any lien law in Canada.

Under the Quebec Code, the right of privilege upon the building exists, without registration of claim, for any debt due the workman and builder during the whole time of continuance of work; and with registration, provided it be registered within thirty days following completion; such right existing for one year only from date of registration.

Preservation of above privilege is subject to the following conditions:—

(a) Notice in writing must be given, or before a witness, to the proprietor, by workman or laborer for each term of payment due and unpaid;

(b) In the case of the architect and builder, such notice in writing must be made to the proprietor or his agent, within eight days of signing contract for the work; or if a sub-contractor, of the contract made with the chief contractor.

(c) The supplier of materials must, before delivery of same, give notice in writing to the proprietor, stating the amount and cost of such materials and the buildings for which they are intended. Within three months following such notice, legal action for seizure must be taken.

The present movement of supply men is to amend the latter clause in order to obtain the thirty days' privilege of the workman and builder.

Annual Convention of Secretaries.—An excellent idea was started by the Detroit Exchange last September to assemble the various Secretaries of Exchanges throughout the United States and Canada for a general interchange of views looking to the extension of the usefulness and benefits of the local Builders' Exchange. The idea is excellent, and should be supported by the local executives in order to become a regular annual event.

Employers' Liability.—Recent legislation throughout the world is steadily tending in the direction of regarding compensation to workmen for injuries caused during work as an employers' liability; that is as an "occupational" risk, practically irrespective of "contributory negligence." The subject was given full discussion at the Toronto Convention, and the final draft of the Ontario Commissioner (Sir Wm. Meredith) has not yet been made public; it is understood, however, to be in favor of grouping different classes of risks, and reducing the workmen's contribution to a minimum. There has also been considerable agitation in Edmonton for an increased [illegible]

It seems to the writer that the only final satisfactory solution will be that of provincial or federal insurance, [illegible] on the German model with proportionate contribution from the employer, the workman and the State, based on actual experience of the cost of accidents in each trade in order to prevent over-assessment, these individual compensation funds should include the establishment of a sinking fund to avoid insolvency on the one hand and to allow for firms dropping out each year; State-control should greatly reduce the cost of "compensation" to the employers, owing to the big leakage, estimated at fifty per cent., in the transfer from liability companies to the workman. Procedure for the adjustment of claims should be as far as possible dissociated from ordinary law-courts, in order to weed out the [illegible] class:

And so far as the contractor is concerned, he should make it perfectly plain as to who pays for compensation insurance, by adding a special charge for the percentage paid as premium against accidents at the close of his tender, in order that owners may realize that compensation is henceforth a factor of cost to be reckoned with.

Industrial Disputes Act ("Lemieux Act").—The writer has previously had occasion to regret the lack of extension of the benefits of this Act to general industries. A somewhat lukewarm resolution was adopted at the last Labor Congress demanding the entire repeal of the Act. No doubt certain labor agitators and trouble-makers evince small affection for a measure which at least in some industries lessens their power for mischief. Although the Lemieux Act is not infallible as a strike-breaker, it undoubtedly has proved of great value in bringing the disputing parties together and getting a plain statement of prevailing differences. The strike, as an economic weapon, is under universal suspicion; workmen have at last discovered, as in the case of the disastrous coal and railroad strikes in England last year, that although they might put the trade-machinery of Britain out of business, it was at the terrible cost of their own suffering wives and children. The Minister of Labor should have his hands strengthened and not weakened in still further extending the scope of the Act, as a means at least of informing public opinion, without whose support no movement can ultimately succeed.

Canada Cement Company

FOR the last year the profits of the Canada Cement Company totalled $1,394,676, and after paying interest and preference dividends a balance of $781,061 is left. The directors state that the policy of reduction in prices will be continued, being regarded as beneficial to customers and the company. During last year the lack of available steamers caused considerable expense, while the higher expense of water transportation of coal and cement caused an increase in cost, and the directors authorized the addition of a burning department to the Winnipeg mill, and an increase in the capacity of this mill to 1,400,000 barrels of cement per annum. This work is now well under way and will, it is hoped, be completed this year. "The construction of the Clinker Grinding Mill at Winnipeg, which was authorized in 1911, has since been completed and is producing cement from clinker shipped from one of your eastern mills. In addition to the improvements at Winnipeg, the capacity of your Exshaw mill has been largely increased.

"Your company has purchased a property at Medicine Hat, Alberta, and when the additional deposits of shale in the vicinity of this property are proved, we intend to construct a mill in this locality. The capacity of your Winnipeg mill, in addition to our present output in the West, will enable us to supply the Western demand with cement manufactured in the West. The future growth will be provided for by the proposed Medicine Hat mill. By manufacturing the cement where consumed we shall avoid many vexatious delays in making deliveries, and also eliminate the heavy water and rail transportation charges incidental to shipping cement from your Eastern mills; consequently we hope that when these improvements are completed we shall be enabled to sell cement in the prairie provinces at a lower price than under present conditions."

The directors report the incorporation of a company—The Canada Cement Transport, Limited—which have purchased two steamers to be used in transporting coal to the plants. The Board endeavored to get a satisfactory property in New Brunswick, but without success; the engineers, however, are continuing their search in hope of getting a property suitable for a mill.

"In the last report to the shareholders, reference was made to the advertising and educational work undertaken by your company. During the past year this work has been enlarged, and in addition your company has undertaken and vigorously carried out a campaign for permanent roads throughout the country. Highway associations have formed in various parts of the Dominion, with the same object in view. Your company is co-operating with these associations, and the results are already apparent, a considerable number of permanent roads being now in course of construction. As concrete is undoubtedly the best and cheapest material for building permanent roads, this will inevitably lead to a largely increased demand for your products.'

The anxiously awaited report of Sir Alexander Binnie and Dr. A. C. Houston, the British experts engaged to report on Ottawa's best source of water supply, was presented on February 17th. It is in the form of a preliminary report and is brief. The lakes in the Gatineau hills are recommended as a source affording water of virgin purity. Should the cost prove too great the alternative is the Ottawa River which would have to be purified by chemical treatment (mechanical filtration). After details of the cost and feasibility of bringing water from the various lakes have been worked out a final report will be made.

The Toronto Board of Trade recently adopted the following resolution: "That having listened to addresses by Mr. L. H. Clarke and Mr. E. A. James, of the Board of Highway Commissioners, York County, on the work the Commission is doing on the roads radiating from Toronto, this Committee recommends that the Council of the Board of Trade of the city of Toronto urge upon the City Council the advisability of immediately building permanent pavements of sufficient width for present traffic on the city roads connecting with those already completed or in course of completion by the Commission in order that advantage may be taken of the work already done."

Ten million dollars is a moderate approximate figure for the educational buildings already decided upon by the various Toronto boards exclusive of the provincial university. Five million dollars for industrial, commercial, high, and public schools have now been approved by the various committees of the Board of Education. Trinity, Knox, and McMaster Universities all have big building projects in progress. The separate school board has a number of new schools to erect this year. For repairs alone the Board of Education will expend $150,000. On public school building account the estimates passed by the property committee ran up to $2,225,000. Another quarter of a million estimate was approved equipment account. Half a million dollars will be required this summer to purchase new public school sites and the enlargement of some of the present ones.

Montreal Builders' Notable Gathering

Significant Speeches at the Annual Banquet held recently at the Windsor Hotel—The Cause of Labor Unrest

In the absence, through illness, of Mr. Joseph Brunet, president of the Montreal Builders' Exchange, Mr. T. Gilday presided at the annual dinner of the Exchange on Saturday, February 15, at the Windsor Hotel. Those at the principal table were Messrs. J. Ballantyne (ex-president), W. Rutherford, W. S. Maxwell, H. B. Ames, M.P., Mayor L. A. Lavallee, the Hon. T. W. Crothers, M.P., Lieut.-Col. A. E. Labelle, harbour commissioner, Lieut.-Col. C. A. Smart, M.P.P., Dr. J. Finnie, M.P.P., Mr. A. Chausse, building inspector, Mr. W. E. Ramsay, and Mr. H. Lauer.

The secretary, Mr. R. L. Werry, read apologies for non-attendance from the Premier, Sir Wilfrid Laurier, the Hon. Jeremie Decarie, Mr. Louis Coderre, Sir Lomer Gouin, the Hon. Mr. White, and Messrs. J. L. Perron, K.C., W. G. Ross, Godfroy Langlois, Dr. Clark, M.P., C. E. Morissette (Quebec), and Ald. L. A. Lapointe.

After the loyal toasts, the chairman alluded to the objects of the Builders' Exchange, one being to bring into harmony architects, contractors, and workmen, recognizing that union was strength.

Lieut.-Col. Labelle proposed the "Dominion of Canada," and spoke of the great future of the country and also of our natural resources. We had, he said, the greatest water resources in the world, which would enable us to obtain cheap power so as to institute manufactories, and to compete successfully with the world.

The Hon. T. Crothers, Minister of Labor, in replying, alluded to several problems which faced this country:—how we were to improve transportation facilities, develop the great natural resources and occupy the almost boundless area of the Dominion. Another important question in which builders were interested was the problem of labor—a problem which had baffled the skill of the most experienced statesmen. Personally, he had no panacea for the solution of all labor troubles. The problem of labor had been in existence for many centuries, and would continue as long as employment was capable of improvement. In old Athens there were ten slaves for every free man; in the great country to the south there were not many years ago five million slaves; less than a century ago in England children worked fourteen hours a day. Under the influence of progress, labor unions and public opinion all these conditions were changed in a hundred years. Labor unions had done much to improve conditions, as also had legislation, but there was a greater force, and one that could and would do even more for progress. That was public opinion.

Why was there so much labor unrest at the present time? If they could find the cause they might be in a position to find a remedy. There was no one cause and no one remedy; but there were two particular causes—one was the selfish employer and the other the indolent workman. He was glad to find so many industries in which there was peace between employers and workmen, and the number of such instances was rapidly increasing. He had great sympathy with the working men, and intended to see that they got a square deal. Generally speaking, he had not much sympathy with the employer who had trouble with his workmen, for it was usually his own fault. Another cause for labor unrest was the failure of employers to realize that men were mere adjuncts to machines.

The wages being paid were very much larger than ever before. Notwithstanding this, however, one of the greatest causes of labor unrest was low wages. How were wages to be measured? Was it by the great principle of supply and demand? No. What was a man entitled to who was able and willing to work a reasonable number of hours a day? He was entitled to sufficient to provide food, raiment and shelter for himself, his wife and his babies, and to put by something for old age and sickness, and that was in the interests of the whole community.

Although conditions were improving, there were corporations and individuals in this country who were piling up millions and keeping the workingmen in starvation. They were a disgrace to any community; they were withholding justice. If some of the wakeful hours spent by these men in thinking of new ways to pile up dividends were devoted to the consideration of the workingman there would be less labor unrest. There was too much work in this country and not enough play. No man ever achieved success with hard work; it was with play. Play was doing something you liked to do—something you were interested in doing. Work was struggling to do something that you did not like to do. The man who attained success was the man who had been playing all the time—the man who could not withdraw from his occupation because he was so interested in it.

Mr. Joseph Brunet, President, Montreal Builders' Exchange

Mr. Crothers concluded by a reference to the Industrial Disputes Act, advocating its extension to private companies. As at present constituted this act had jurisdiction only in disputes between public utilities and their men. Of 150 disputes coming under the act for arbitration there were strikes in only 15 cases.

Large Public Works

Mr. H. B. Ames, M.P., referred to the death of Mr. Peter Lyall, and remarked that he had left his mark on the buildings of Montreal. Members of the Builders' Exchange were men who were doing things. Canada's [illegible], which a few years ago amounted to $100,000,000, would for the present year attain the enormous total of [illegible]. Heavy expenditures were necessary upon public works, and more of the great cities were this year to be endowed with magnificent public buildings. No less than $100,000,000 were to be spent on various public works, including fifty millions on railways and canals, and $25,000,000 on public works, while in Montreal, Toronto and Ottawa large sums were to be spent on public buildings. Capital and labor must work in unison, and it was only when harmony existed that the greatest progress could be made.

Canada's various resources were mainly in raw materials. Other countries had fought for their wealth, but every dollar of Canada's money must come from developing the resources of the country. Canada's industrial enterprises had sold bonds abroad, her railways were built with borrowed money and they could only continue this golden stream by maintaining faith with the lenders. Every dividend sent abroad was a guarantee of the good faith of Canada. If capital and labor continued to work harmoniously there was nothing in the way of achievements that Canada could not expect.

In proposing the toast of the City of Montreal, Lieut.-Col. C. A. Smart, M.L.A., of Westmount, who represented the Canadian Manufacturers' Association, dealt with the growth and development of the city. In the matter of protection from fire it had progressed greatly, but he advocated more attention to the prevention of fires. If this were done, the saving would be enormous. The city also needed better water service and better building inspection. The latter department was under-manned, and with the small staff it could not be expected that adequate service could be given.

Mr. Thos. Gilday, who presided at the Annual Banquet of The Montreal Builders' Exchange

Dealing with the labor situation, Col. Smart pointed out that owing to the unions not being incorporated they could break agreements with impunity, while the employers, being incorporated, could be sued. What was needed, if there were to be more harmony between employer and employed, was national and not international unions. Most of the labor troubles in Canada had been stirred up by men from over the border. There was no country in the world in which the workmen received higher wages than in Canada. If they had industrial peace it was because the employers recognized that a fair day's work was entitled to a fair day's wages.

In replying to the toast, Mayor Lavallee spoke of the great progress Montreal had made; and alluded to the fire brigade as equal to any on the continent. The new building code would soon be ready, and he hoped it would provide for all emergencies.

Mr. W. Rutherford proposed "Our Cause," and spoke of the signs of a big year's trade. He also alluded to the harmony between the Exchange and the workmen, and said that Mr. Lauer had a special gift in arranging any difficulties.

The Lemieux Act—Duty on Cut Stone

Mr. H. Lauer touched on three or four points of interest to contractors. There was the question of workmen's compensation, which they ought to get out of the arena of law, so that the money did not go into the pockets of lawyers instead of the workmen. He desired to see the extension of the Lemieux Act, in order to include the building and other trades; this would tend to the prevention of strikes, which were ruinous to both masters and men. With regard to the Lien Law, which affected builders, there was need of an amendment in Quebec, in so far as it applied to supply men. In their case written notice had to be given to the proprietor before supply men supplied goods to the contractor, and it was desired that the Act should be amended so that the right of privilege be given upon the building, providing that it be registered within thirty days following completion—thus falling into line with the rights of the workman and builder. Mr. Lauer expressed the opinion that the demand of the western contractor for a lower duty on cement and for cheaper prices was quite justified. With regard to the higher duty on cut stone which was asked for, Canada had very valuable stone resources, but they saw buildings being put up with imported stone. West of Winnipeg there were sixty quarries not used because of the lack of proper protection. Mr. Lauer spoke of the value of cooperation between masters and men, but remarked that the masters objected to paying the same rate of wages to incompetent as to competent men.

Mr. W. E. Ramsay proposed "Our Guests," to which Dr. J. P. Finnie, M.P.P., replied, touching on the immense resources of lumber, water powers, and asbestos in the province of Quebec.

An Architect's Views

Mr. W. S. Maxwell, vice-president of the Architects' Association of the Province of Quebec (who was introduced as one of the best architects in Canada) alluded to the loss by death of some of the old architects, and also the dropping out of some old firms owing to modern conditions. In his view, it would be a great mistake to put a further duty on stone. Canada had some splendid granites which were used because architects wanted them. Missisquoi marble was being used in this country and even in the United States, and it was used on its merits, and they would not like to see this marble kept out of the United States. Canada had some very fine stone, better than Ohio and Indiana stone, but it was not suitable for architectural purposes, and if the builders thought that a higher protective duty would keep out the American stone, they were greatly mistaken. He had had submitted to him a good piece of Belleville stone, and he was prepared to use it, but on examination of the quarry he found that there was not sufficient of the high grade quality required, and greatly to his dissapointment he had to give it up. In certain matters, Canadians were behind the times. For instance, take terra cotta, which came largely from Great Britain and the United States. Why was not a plant started in Canada? He was told "We will, just as soon as the demand is great enough." If terra cotta could be made in the United States, why could we not do it here? Then as to bricks, manufacturers were concentrating their attention on common descriptions. Why did they not go in for higher grades? He was perfectly certain that if brick makers would look into this matter, supply the desired chemicals, etc., they could make as good bricks, say of the tapestry grades, as in the

United States. There were opportunities in this country for brick makers to produce the higher class of goods. The City Improvement League were about to consider the question of better dwellings, and if the Builders' Exchange and the Architects' Association would co-operate good results might follow. Montreal had as bad slums as any city on the Continent, and the architects would be glad to go into this question with the Builders' Exchange. The Association would also be pleased to discuss from time to time various matters in which they were mutually interested.

Mr. A. Chausse also spoke briefly.

The last toast, that of "The Press," was proposed by Mr. J. Ballantyne, and responded to by the representatives of the "Contract Record" and "The Witness."

Winnipeg Builders' Exchange Annual Banquet

SOME two hundred and fifty members attended the annual banquet of the Winnipeg Builders' Exchange, held recently in the banquet hall of the Industrial Bureau at Winnipeg. The chairman of the evening was Mr. W. J. Davidson, president of the Exchange. The city was represented by the Mayor, Mr. T. R. Deacon, of the Manitoba Bridge & Iron Works, himself a prominent member of the Exchange. Mr. E. H. Rodgers, the city building inspector, and Mr. Chas. F. Roland, industrial commissioner, were also among the guests.

Mayor Deacon, in the course of his remarks, said the management of the city of Winnipeg was a problem in dynamics and of all the forces at work in its growth none was more potent than the Builders' Exchange and its members. He referred to the twenty million dollars' worth of building done in 1912, and said that one of the greatest problems confronting the city to-day was in keeping pace with the rapidly-increasing population. The question of financing public improvements when whole streets were added at a time was no small one. He also spoke of the progress which had been made towards providing for the city and the seven other municipalities concerned a visible supply of water. In the three weeks in which the council of 1913 had been in power they had done a large amount of preliminary work, and he hoped the question would soon be satisfactorily settled.

The toast to the Canadian National Association of Builders' Exchanges, of which Mr. W. J. Morley is president, was proposed by Mr. W. J. Davidson and responded to by Mr. Morley, who is also president of the International Association of Master Painters and Decorators. Mr. Morley extended the greetings of the C. N. A. B. E. to the local organization and said that he believed that when the invitation was extended to the International Association of Master Painters and Decorators, that its annual meeting the place of which is changed from year to year, would be held in Winnipeg.

Mr. Charles Roland, industrial commissioner, explained with assistance of stereopticon views, a portion of the work carried on by the bureau, and asked for the collective and individual assistance of the Exchange in the work of making Winnipeg known all over the world.

During the evening the prizes to the winners in the Bonspiel were distributed. The winners were for the Carter Cup Competition, T. E. Briggs, E. J. Hall, J. E. Braid and E. H. Smith, skip; the individual prizes being gold watches, presented by the Manitoba Gypsum Company; second prize, A. O'Brien, L. A. Stout, H. Deneen and Charles Dure, skip, rings presented by the McDonald Dure Company; third prize, T. H. Wood, G. Anlserooke, A. Sutherland, Howard Wood, skip, clocks presented by The Lake Winnipeg Shipping Company; fourth prize, Victor McNeil, S. M. Lyone, C. S. Sanderson, A. J. Barnes, skip, fountain pens presented by the Winnipeg Paint & Glass Company. For the Minty Cup, consolation prize, first, C. E. Lewis, R. Dunbar, F. Baxter, P. McDermott, Jr., skip, watches presented by the Canada Cement Company; second prize, G. W. Bohn, R. Davidson, Thos. Carney, B. Holden, skip, travelling cases presented by Thomas Black; third prize, [illegible] A. Billing, S. Taylor, W. H. Sinclair, skip, chains and lockets presented by Dominion Gypsum Company; fourth prize, Charles Read, W. Watson, R. L. Fulton, A. A. Learie, pearl set tie pins presented by Winnipeg Ceiling & Roofing Co.

Wage Scale for Saskatchewan

The fixing of a minimum wage scale in the building trades in Saskatchewan for the ensuing year, the passing of resolutions disapproving of an increase in the demurrage rates, and asking for the suspension of the duties on cement and crude stone imported from the United States formed the principal business of the concluding session of the Saskatchewan Builders' Exchange. The following is the new minimum wage scale per hour adopted:—

	1912	1913
	cents	cents
Bricklayers	[illegible]	70
Masons	[illegible]	70
Stonecutters	65	[illegible]
Plasterers	60	[illegible]
Electric workers	45	50
Painters	45	50
Paper hangers	40	45
Carpenters	45	50
Plumbers	40	45
Steamfitters	40	45

Toronto's revised building by-laws were approved by the Civic Property Committee recently, after a few minor amendments had been made. The question of the height limit for buildings was referred back to permit the City Architect to make a fresh recommendation thereon. It was suggested that a height limit should be set for different sections of the city. It was also agreed that brick work on the outside of external columns and curtain walls in skeleton constructed buildings need only be 4½ inches instead of 9 inches. [illegible] in buildings with [illegible] windows [illegible] ings in the frames should be allowed as a means of escape in case of fire. A specification for hollow tile construction will be drawn up and inserted in the by-law.

Mr. Ray R. Knight, A. M. Can. Soc. C.E., Assoc. Inst. M. & Cy. E., the newly appointed city engineer of Fort William, held the post of chief designing engineer in the Sewer Department of the Department of Works, Toronto. In addition to the laying out and design of sewerage schemes and storm overflow sewers, he reported upon the house refuse question of the city. Previously to coming to Canada in 1910, Mr. Knight was for five years Deputy Town Engineer of Bromley, Eng. He had also been engaged in municipal work in Wood Green, London, and Folkestone, England. He was articled to the Town Engineer of [illegible], North Wales.

Messrs. [illegible] Miller & Company, [illegible] have opened a construction branch in connection with their general [illegible] and investment business.

Building Operations at Winnipeg

Correspondence of the Contract Record

OPERATIONS in the Winnipeg constructional field are progressing satisfactorily and the building permits for the year to date approximate in value $[illegible]. The tightness of the money market of [illegible] had a tendency to restrict smaller building work.

The contract has been let to the George H. Archibald Company for the new factory building for the Smart Woods Bag Company. The contract price is in the neighborhood of $200,000. The building will have a frontage of 147 feet on Laby street and 98 feet on Pacific avenue. There will be five storeys and basement, the first floor being used as the main office of the company, and the remainder of the building as a factory. The new building adjoins the three-storey structure in which the firm are at present carrying on their business. Work was started last week on the excavating for the foundations and it is the intention to hurry the work to completion.

An apartment block is in course of erection for Mr. A. E. Moore on the southwest corner of Maryland street and Alloway avenue. The block is of three storeys and basement and has a frontage of approximately 100 feet on Alloway avenue and 60 feet on Maryland street. The north and east walls and part of the south wall are faced with red pressed brick and the remainder of the rear of the building with yellow brick. The foundation walls, window sills and header courses and other trimmings are of Tyndall cut stone. The floors are reinforced concrete laid on the Kahn system. Mr. Charles S. Bridgman is the architect and Mr. A. M. Simpson the contractor.

An extensive new apartment block is being built for the Belgo-Canadian Real Estate Company on the southeast corner of John street and Wardlow avenue, just off Wellington Crescent. The outline of the building is a square, but there is a large court opening out on to John street, and a bay along each face so as to utilize natural light to the fullest possible extent. The building is faced with red pressed brick and has cut Tyndall stone window sills and header courses. The window lintels are formed of brick on edge. The floors are reinforced concrete, the Kahn system of construction also being used in this block. The exterior work is completed and the scaffolding is now being removed.

An apartment block is being erected on the northwest corner of Hugo street and McMillan avenue. This block has a frontage of 116 feet on Hugo street and 96 feet on McMillan avenue. There are four storeys, including basement, and it will be divided into twenty-nine suites. This block is the first of its kind in Winnipeg. It is built on the Kahn system of reinforced concrete with hollow tile partition walls. The roof is real Spanish clay tile. Mr. Thomas Sharpe, the owner, is doing the general contracting work. Messrs. Hooper and Hooper are the architects.

The city of Winnipeg has awarded the contract for an extension to No. 2 sub-station on McPhillips street to Head, Shannon and Head, the price being $12,000. The city will shortly call for tenders for an extension to the May street sub-station. —L.R.M.

Claiming that the industrial prosperity of Canada, and particularly of Ontario, demands instant action on the part of the Dominion Government in the line of the development of Canada's water transportation facilities, representatives from a number of municipalities of Southern Ontario met at Berlin recently at the convention of the Great Waterways Union and adopted a policy which it is hoped will result in the construction of an all-red water route from the Atlantic Ocean to the Rocky Mountains. After considerable discussion a series of resolutions were passed which, stated briefly, ask the Dominion Government for the following steps to be taken: (1) The immediate construction of the new Welland Canal, providing for a draught of 30 feet for ocean liners, before the Panama Canal and the new Erie Barge Canal get control of Canada's shipping; (2) no further expenditure upon the Georgian Bay Canal until an unbiased report on the feasibility is received and published by the government; (3) the investigation of the St. Lawrence River route for ocean liners and of the rivers in Western Canada connecting with Lake Superior for barges; (4) the formation of a commission to make these investigations; (5) the appointment of Hon. Adam Beck to the commission; (6) the completion of the outer breakwater of Goderich harbor.

Canadian Railroad Development

The city of Saskatoon is considering raising $100,000 for a municipal street railway system.

The Board of Works of London, Ont., have arranged a special meeting for the purpose of appointing a city engineer.

The Ottawa-Morrisburg Electric Railway Company is planning to start work in the spring on the construction of its projected line from Ottawa to Morrisburg.

The Railway Committee of the House of Commone recently threw out a bill for the incorporation of the Huron Lake Shore Railway Company. This railway proposed to build from Sarnia to Meaford.

The Hyland Navigation & Trading Company, Winnipeg, has the contract for constructing the Grand Trunk Pacific Railway from Hartney into Brandon, 50 miles. Material for the branch will be brought to the right of way during the next few weeks, so that active work may be started as soon as the weather permits.

The tunnel which the Canadian Northern Railway Company are driving through Mount Royal, Montreal, is now more than one-third completed, and progress is being made at the rate of about 65 feet every 24 hours. More than 6,000 feet has been cut out of a total of 17,500 feet and it is hoped that the work will be finished by the fall.

Work will be started immediately on the grain exchange at Fort William. This building will be five storeys in height with a frontage of 100 feet on Victoria avenue and 125 feet on Syndicate avenue, and will be of reinforced concrete construction. The building will be ready for occupancy by September 1st. The contract price is $275,000.

The Temiskaming & Northern Ontario Railway is reported to have decided to construct an additional branch connecting Abitibi River with the main line next spring. By leaving the main line at a point about half a mile north of the Iroquois Falls station and running on a line almost due east to Abitibi River, the railway will be able to connect with that body of water by a line about seven miles in length.

The new roundhouse which is being constructed at St. Lambert, Que., for the Grand Trunk Railway System by the John S. Metcalf Company, is rapidly approaching completion, and will furnish accommodation for housing and repairing 27 locomotives of the largest type. The structure, which as a whole comprises roundhouse, machine shop, boiler house, fan house, office and stores, castings store, and sundry accessories, is constructed in concrete, steel, brick, and timber, the whole being built on concrete foundations 2 feet 3 inches in thickness, carried down to solid rock.

which is found about 2 feet 6 inches below natural ground line.

The Canadian Northern Railway will apply to the next session of the legislative assembly of the province of Alberta for an act to enable the company to construct a line from a point at or near Taber to a point in the north near Consort; a line from Calgary in a north-westerly direction to a point between its Bazeau branch and Cochrane; also another line from Calgary in a south-westerly direction to a point on its line between Cochrane and Pincher Creek. These lines are all feeders to Calgary and will likely be completed in 1913. The company is also applying for authorization to build a line from Cardston to the westerly boundary of the province.

Mainly Constructional

The News in Brief—From Coast to Coast

It is proposed by the Canadian Cresoting Company to erect a plant at East Trenton, Ont., at a cost of $200,000.

It is probable that the Montreal Council will, next year, employ motor trucks to remove most of the snow from the streets.

The city architect of Toronto has refused to comply with the request of a number of architects to amend the building by-law by reducing the pressure per square foot from 75 to 50 pounds for office buildings. The pressure for houses is now 50 pounds per square foot.

The Britannia public school at St. James, which will be formally opened shortly, is one of the finest schools in Manitoba. It has been built on the most up-to-date lines, and possesses its own water and sewage works and has automatic heating and ventilating arrangements. It has been built at a cost of $150,000.

The city of Toronto's duplicate intake pipe was recently placed in commission. It has a capacity of 90,000,000 gallons of water per day, which, with the 60,000,000 gallon capacity of the old intake, gives the city a possible supply of 150,000,000 gallons of water every day. It is not anticipated that the cost will exceed the original estimate of $465,000.

One of the largest clay products plants in Canada will shortly be erected at Dunmore, Alta., and an initial expenditure of about $100,000 will be necessary. The company, which has been formed by some Indiana capitalists, will be known as the Dominion Clay Products Company, and it is the intention of the promoters ultimately to spend $300,000 in perfecting the plant.

In common with the Vancouver board, the Victoria school trustees have been approached by the local chapter of the British Columbia Society of Architects to stop the procedure by which a single architect has acted for the board and to call for competitive designs in future. The school board decided last evening to call for designs in competition among the architects after the present schools under consideration are completed.

The building contractors of the province of Saskatchewan met in Prince Albert on February 8th to 11th, about seventy being present. One of the chief points discussed was the insurance compensation act of the province of Saskatchewan, and it was decided to ask the provincial league to take steps towards establishing a department of liability insurance to deal exclusively with the liability insurance of the province to protect and promote the interests of society.

Escher Wyss & Company, Montreal, have been awarded the contract for the manufacture and installation of three water wheels and governors of 6,800 h.p. each, for the extension of the city of Winnipeg power station at Point du Bois. Although Escher Wyss & Company's price was the highest of all competitors, their tender was the most advantageous for the city as they guaranteed by far the highest power when using existing foundations and draught tubes.

Tenders will shortly be called for the erection of St. Chad's College, Regina, one of the group of buildings surrounding the cathedral for the Anglican diocese of Qu'Appelle, the ultimate expenditure on which will be $1,000,000. The building to be erected immediately will be 175 feet long, with an average width of 60 feet. In connection with it there will be a chapel of brick with terra cotta ornamentation, three storeys high and basement. Messrs. Brown & Vallance are the architects.

A deputation from Montreal South, St. Lambert, and Longueuil, P.Q., have asked the government to assist in the construction of a sewer from St. Lambert to Longueuil, at a cost of $327,000. The sewer will run through a part of Crown land, and it was requested that the government should either contribute to the cost of the drain or else hand over the land as a public park. If neither of these suggestions were adopted, the delegation asked that the land be sold to private owners, who will bear their share of the cost of the sewer.

According to the report of the Canada Foundries and Forgings Limited, Brockville, Ont., which took over the business of the James Smart Manufacturing Company, Brockville, the Canada Forge Company, Limited, Welland, and Canadian Billings & Spencer, Limited, Welland, there is a balance of $25,680 after providing for bond interest and preferred dividends, depreciation, and 20 per cent. of organization expenses. A fire at the Canada Forge Company's plant enabled the construction of a larger steel structure. The sum of $63,813 was expended during the year on additions to plant.

The Dominion Bridge Company have been awarded the contract for the superstructure of the new spandrel arch bridge to replace the present suspension bridge at St. John, N.B., at a cost of about $275,000. The superstructure will contain about four and a half million pounds of metal, the bridge having a width of fifty feet and provision for two street railway services, two driveway services and two sidewalk services. The contract also calls for the construction of reinforced concrete flooring for the bridge, with a creosoted block wearing surface on the driveway. The bridge is to be completed and ready for use by June 1, 1914.

Specifications for the 85,000 barrels of cement and the 3,000 tons of asphalt which are required by the city of Calgary paving plant this year have been prepared by chief [illegible] Field, the laboratory expert employed temporarily in an advisory capacity by the city. Mr. Field is making a special investigation of paving in this city, and his specifications have been made to meet the necessity for first-class material in every essential detail. When the tenders are accepted, Mr. Field will make an analysis of samples from each shipment to see that it is up to standard. Mr. Field is highly pleased with Calgary's paving plant, which is, in his estimation, one of the best equipped on the continent.

In view of the Dominion Government having under consideration the re-enactment of the remission of fifty per cent. of the duty off cement, Mr. F. P. Jones, general manager of the Canada Cement Company, in the course of correspondence with the Hon. T. White, Minister of Finance, states that: "The present policy of the Canada Cement Company was formed and adopted with the belief that the policy of the government was to give the cement industry in Canada adequate protection. If the cement industry is [illegible] it will be placed in a dangerous position, and if it can exist will be able to do so only by changing its policy on every occasion and in every market obtaining the highest possible price for its product, in order that, should business again be depressed in the United States, we in Canada will be in a position (through having accumulated a reserve) to meet the American slaughter prices by operating our mills at cost, or less than cost, while such American prices are in effect."

Cost of Operating Steam Rollers

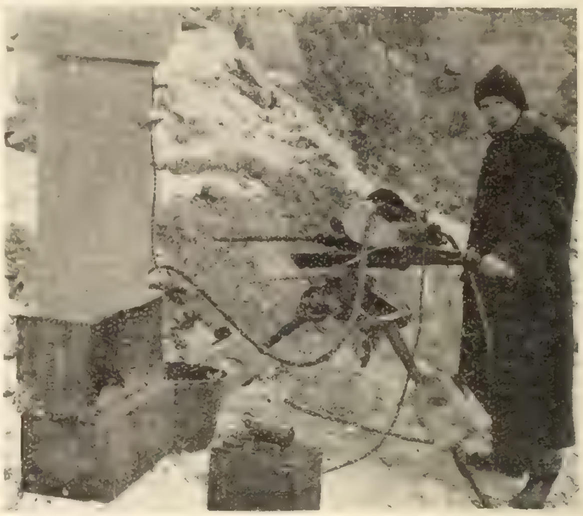
The author of an article under the above heading, published on page 54 of the Contract Record for February 19, was Mr. E. A. James, B.A.Sc., of Messrs. James, Loudon & Hertzberg. In our reproduction of the article the name of the author was inadvertently omitted. Mr. James is Engineer to the York Highway Commission.

A New Gasoline Rock Drill

Mr. L. L. Scott, of 1013 Chestnut street, St. Louis, Mo., has been working on gasoline rock drills for the past seven years and has at last developed a practical machine of this type, for which O. W. Meissner, Montreal is representative.

Mr. Scott has four sizes of machines, all of the same type and design, differing only in size and capacity. The smallest drill is held in the hand and weighs 35 lbs.; the next size, which is 85 lbs., without the mounting, will drill holes up to five feet deep; the third size weighs 140 lbs. and will drill holes up to ten feet deep; the largest machine weighs 265 lbs. and will drill holes up to 20 feet or more.

This drill has been carefully worked out in every detail. It is the result of a great many years of experimenting and the building of some eighteen different models. This final machine is very simple, very light for its capacity, and will drill rock at the rate of from three to fifteen inches a minute. The largest machine uses only two gallons of gasoline per ten-hour run. The cylinder and piston are oiled automatically by oil that is mixed with the gasoline, so that as long as the machine runs it gets oil in the proper proportion. The roller bearings are packed with grease and require attention once a month. In "close" ground, the exhaust is piped into water or led to the mouth of the shaft or tunnel. If pipe lines of several hundred feet are used, it is sometimes advisable to put a small suction blower at the end of the pipe, to reduce the back pressure. With any ventilation at all, it is not necessary to pipe out the exhaust.



Gasoline rock drill in operation.

While under test, recently, this machine gave splendid satisfaction and for its size compared favorably with any air drill on the market. The machine shown here is the medium weight, good for holes up to six or eight feet. The horse power of the engine is about 1½. The larger and smaller machines are all constructed on the same principle.

Roofing Protection at Forty Below Zero

The accompanying illustration is a view of the new plant of the Northern Electric Heat & Power Company, at South Porcupine, Ont. Here the temperature not infrequently falls to forty below zero and the roofing and insulating problem was a considerable one. A material was required that would prove an effectual insulation against this excessive cold—and which at the same time would not crack and go to pieces under low temperatures. Furthermore, it was necessary to have a roofing that would withstand the melting snows of spring, without rusting or rotting—and that would not dry out and run during the summer. In short, owing to the extreme climatic conditions, a practically indestructible roofing was required. And added to these conditions they demanded a roofing and siding that would afford perfect fire protection. In 1911 the town had been swept by a terrific fire, resulting in the loss of much valuable property and many lives. The conflagration had taught its lesson. After carefully considering numerous roofings, a thorough test was made of J-M Asbestos Roofing and a siding known as J-M Asbestoside, manufactured by the H. W. Johns-Manville Company. The test proved so successful that a number of property owners in addition to the Northern Electric Heat & Power Company, adopted these materials in their rebuilding operations. J-M Asbestos Roofing and J-M Asbestoside are all-mineral. They contain no vegetable or animal matter—nothing but pure Asbestos fibres and Trinidad Lake Asphalt, built up layer on layer into a sheet of "flexible stone."

Northern Electric Heat & Power Company's plant at South Porcupine, Ont. Roofed and sided with J-M Asbestos roofing and J-M Asbestoside.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Brandon, Man.
Municipal improvements. Council has passed motion to spend $600,000 for street paving, sewers, etc. Clerk, Harry Brown.

Bridgetown, N.S.
Paving, cost $6,000, contemplated by the town council. Mayor, Karl Freeman. Town clerk, Harry Ruggles.

Cowley, Alta.
Waterworks system is contemplated by the Council and a committee is looking into the matter. Secretary-treasurer, A. Tweedy.

Calgary, Alta.
Paving for C. P. R. Dept. of Natural Resources. Tenders received by Chief Engineer, A. S. Dawson, until March 29th. For concrete paving on the dams of Lake Newell Reservoir, about 11,200 cubic yards of paving and 8,700 cubic yards of gravel base. Plans, specifications, etc., at office of engineer.

Cayuga, Ont.
Roadways for County of Haldimand. Clerk, T. A. Snider, K.C. Council are having plans prepared for 26 miles.

Hamilton, Ont.
Electric pumping station. Mayor, John Allan. Engineer, A. F. Macallum. Architect, W. A. Edwards, 2 Hughson street south. The Board of Control has ordered new plans to be prepared. Building, complete with equipment will cost $70,000. New pumps and motors required.

Kincardine, Ont.
The town council (water commissioners) contemplate the purchase of waterworks pump. Chairman, ex-mayor Patterson.

Regina, Sask.
Tenders received by Clerk, A. W. Pool, until March 15th, 1913, for supply of 6 500 h.p. water tube boilers; 2 133,000 cubic feet. per minute fans and stacks. Specifications, etc., at office of Supt. Light and Power, E. W. Bull.

St. Thomas, Ont.
The city council contemplate the purchase of fire apparatus and waterworks equipment. Mayor, R. N. Price.

Steelton, Ont.
Waterworks system, cost $50,000. Work includes laying of intake pipe, erection of pumping station, machinery, etc. Mayor, Jas. Lyons. Clerk, J. Robinson. Town engineer, W. B. Redfern. Plans in progress.

Swift Current, Sask.
Cast iron pipe and specials required by the town council. Mayor, A. W. Snider. Engineer, Geo. D. Mackie. Cast iron or steel pipe. 6 in. diameter, 141 tons or 8,566 cu. ft.; 8 in. diameter, 50 tons or 2,230 lin. ft.; 10 in. diameter, 160 tons or 5,346 lin. ft.; 12 in. diameter, 24 tons or 6,214 lin. ft.; C.I. specials approximately 7 tons or about 100 pieces. Specifications, etc., at office of Engineer. Sec.-Treas., will receive tenders till noon March 17th, 1913.

Valves and hydrants required by town council. Mayor, A. W. Snider. Engineer, Geo. D. Mackie. Specifications etc., at office of Engineer. Sec.-Treas. will receive tenders until March 17th, for supply of the following: 37 6 in. valves and boxes; 3 8 in. valves and boxes; 3 10 in. vales and boxes; 3 12 in. valves and boxes; 22 6 in. fire hydrants.

Winnipeg, Man.
Concrete pavement. Concrete pavement for road on both sides of Red River, for Municipality of Kildonan. Sec.-Treas., Harry Thompson, 215 Chamber of Commerce Building, Winnipeg. Tenders may be called in 2 or 3 weeks. By-law will not be submitted for at least 6 weeks.

Water pipe and valves required by Board of Control. Sec., M. Peterson. Engineer, H. N. Ruttan, 223 James Ave. Specifications at office of Engineer. Tenders received by Secretary until March 6th, 1913.

CONTRACTS AWARDED

Winnipeg, Man.
Concrete roadways for Municipality of Fort Garry. Sec.-Treas., Chas. J. Drake, 520 McIntyre Block, Winnipeg. Engineer, D. R. Baribault, 607 Builders' Exchange Building, Winnipeg. General contractors, Guilbault & Co., Desmeurons and Goulet street. 16,000 ft. of 16 ft. concrete road 6 in. in depth.

Railroads, Bridges and Wharves

Calgary, Alta.
C. N. Ry. Co.'s plan of overhead highway bridge to be constructed at MacLeod Trail, Calgary, Alta., has been approved.

G. T. P. Branch Lines Co. has been authorized to construct bridge over Bow River at mileage 198 on its Tofield Calgary branch, Alta., and also across Assiniboine River at mileage 19.5 Brandon Branch in S.E. ¼ Sec. 21-10 18 W.P.M. Dist. Brandon, Man

G. T. Rly. Co. has been authorized to construct spurs for the Gainford Collieries Ltd., Sec. 14-53-6 W 5 M Dist North Alberta, Alta.

Charlottetown, P.E.I.
Marine slipways planned by Dom. Govt. Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Surveys [illegible] and plans prepared for two slipways, each 400 ft. long, to be used for repairing vessels. If cost is [illegible]

Hamilton, Ont.
Track elevation, subways, etc., cost $760,570, Hunter street, for Toronto, Hamilton & Buffalo Railway. Pres., J. N. Beckley, Rochester, N.Y. Supt., E. J. Ebers. Engineers, Westinghouse, Church Kerr Co., New York. Company has filed rough plans and city will fight for track depression.

G. T. Rly. Co. has been authorized to construct siding for the Canadian Glass Manufacturing Co., Ltd., Hamilton.

Ile Aux Coudres, Que., Charlevoix Co.
Tenders received by Secretary, Dom. Govt. Dept. of Public Works, R. C. Desrochers, Ottawa, until March 18th. Plans, specifications, etc., at offices of A. R. Decary, Dist. Engineer, Post Office Building, Que., J. L. Michaud, Dist. Engineer, Merchants Bank Building, St. James street, Montreal, Postmaster, the Aux Coudres, at Dept. Ottawa, specifications also at MacLean Daily Reports, Toronto.

London, Ont.
The C. P. Rly. contemplate moving present station back 18 ft., putting a new cement foundation under it and building cement platforms and approaches 400 ft. long. Engineer, W. Tapley. Address Supt. King.

Ottawa, Ont.
Conduit system, cost $44,292, Elgin, Gloucester and Laurier avenue, contemplated by city council, electrical department. Mayor, J. A. Ellis. Engineer, Supt. Brown, City Hall.

Province of Ontario
Algoma Central & Hudsons Bay Rly. Co. has been authorized to construct bridge over Chippewa River. Mileage 6.25, Dist. Algoma, Ont.

Province of Quebec
C. P. Rly. Co. has been authorized to construct bridge No. 10.4 on Farnham Subdivision of its railway.

Province of B. C.
Grand Trunk Pacific Railway Company has been authorized to construct bridges across Goat River, mileage 243, Wolf Creek West, B.C., and also across Rou Shuswap River at mileage 208, Wolf Creek West.

Redford, Alta.
C. P. Rly. Co.'s location of station in Sec. 6-39-19-W-3-M at Redford, Sask., [illegible]

St. John, N.B.
The Dom. Govt. Dept. of Public Works [illegible] ton floating crane for St. John Harbor. Sec., R. C. Desrochers, Ottawa. Commissioner wharves, H. B. Schofield, [illegible] John.

Saskatoon, Sask
[illegible] will construct concrete subway and steel

[illegible] on Seventh avenue where the [illegible] passes beneath the railway tracks.

Sutherland, Sask.

Depot, [illegible] cost $[illegible] 100 x 40, for [illegible] P. Rly. Plans will be prepared.

Twp. Pembroke, Ont.

C. P. Rly. Co. has been authorized to construct [illegible] for the Pembroke [illegible] Mills Ltd. in Lot 18 Con. 1 Twp. Pembroke, Co. Renfrew, Ont.

Twp. Medonite, Ont.

Canadian Pacific Railway Company has been authorized to construct bridge No. 842 on Muskoka sub-division of its lines in Twp. Medonte, Co. Simcoe, Ont., near Eady.

Toronto, Ont.

Bridge, Gerrard street, planned by the city. Steel arch on concrete abutments over Don River, 125 ft. span. Two 100 ft. approaches plate girder type. Sanction has been given by Board of Control to sketches prepared by City Engineer's Department, and work on detail plans will be commenced at once. Tenders will not be called before May 15. Mayor, H. C. Hocken. Commissioner of Works, R. C. Harris.

G. T. Rly Co. has been authorized to renew bridge No. 6 over Queen street west, Toronto.

The Massey-Harris Co., Ltd., 915 King street west, has been authorized to construct bridge over G. T. R. at Stafford street & Wellington avenue.

Vancouver, B.C.

C. P. Rly. Co. has been authorized to construct bridge No. 101.5 over Kanaka Creek, Cascade Sub. Div. B.C.

Winnipeg, Man.

Car barns, Sargent avenue and Erin street, for The Winnipeg Elec. Rly. Co., Portage avenue. Manager, M. H. Phillips. Work will be commenced as soon as plans are prepared.

The board of control will be asked to consider the erection of a bridge over the Assiniboine River at Donald street. Sec., M. Peterson. Engineer, H. N. Ruttan, 223 James avenue.

CONTRACTS AWARDED

Winnipeg, Man.

Addition to station and hotel for Canadian Pacific Railway. Architects, Westinghouse, Church, Kerr & Company, 511 Coristine Bldg., Montreal and New York. Structural engineer, J. G. Sullivan. Twelve storeys, wing addition, stone foundation, pressed brick and structural steel construction.

Public Building, Churches, Schools, etc.

Acton, Ont.

Public building, Mill street. Dom. Govt. Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Tenders will be called shortly.

Berlin, Ont.

School, cost $4,000, for St. Paul's Lutheran Church, W. H. Schmaltz. Architect, Charles Knechtel, has prepared plans. Tenders to be called shortly. Two storeys, 60 x 35.

Bridgewater, N.S.

School. Town clerk, Jas. Currl. Architect, Andrew R. Cobb, Cragg Building, Halifax, N.S. Separate tenders received by clerk until March 8th, for masonry, carpentry, painting, heating and plumbing. Plans and specifications at office of town clerk and with architect.

Copper Cliff, Ont.

Theatre, planned for Algoma Amusement Co. Sec.-Treas., Miss Glades Potter. Frame construction.

Edmonds, B.C., Vancouver Heights

Police sub-station planned for Municipality of Burnaby. Clerk, Arthur G. Moore. Council has decided to erect police sub-station, to combine offices, cells, stabling quarters and perhaps a public hall.

Esquimalt, B.C.

Addition to school planned by the Board of Education. Sec., A. Mulcahey. Addition of two wings to seat 450, an assembly room to seat 800 and a school room over the assembly room, hot water or steam heating, septic tanks, concrete floors in basement, ventilating system. Plans will be received by board and selected in competition.

Fort William, Ont.

The Board of Education is planning alterations and additions to schools. Secretary, Geo. Cook.

Fredericton, N.B.

Two fire stations, cost $30,000, King street, contemplated by city council. Brick construction. Further particulars from Clerk, J. W. McCready. Plans will be prepared.

Police station, cost $8,000, planned, and legislation has been applied for by city council. Further particulars from Clerk, J. W. McCready. Brick construction.

Grey Twp., Ont.

Church, cost $6,000, planned. Tenders received by J. K. Baker, in trust, Henfryn, P.O., until March 1st. Stone and cement foundation, white brick construction, stone trimmings.

Hamilton, Ont.

Alterations to church, cost $10,000, James street south. Pastor, Rev. J. J. Ross, 85 Queen street south. Architect, H. New, Spectator Building. Alterations to include remodelling of basement, building, choir gallery, new lighting and heating systems. Plans in progress.

Indian Head, Sask.

Drill Hall will be included in estimates of Dom. Govt., Dept. of Militia & Defence, to be erected for the 16th Light Horse. Capt. Joseph Glen, M.L.A. Secretary, E. F. Jarvis, Ottawa.

Kamsack, Sask.

School, cost $7,000. Two storeys and basement, 36 x 38, brick, stone foundation, . Tenders will be called about Mar. 18. Sec.-treas., Jno. Bowes. Architect, E. G. Sherwood, 3 Commonwealth Block, Winnipeg, Man.

Kingston, Ont.

Barracks, cost $20,000, for Salvation Army, Headquarters, Toronto. Architect, Major Miller, 20 Albert street, Toronto. Stone foundation, brick construction, felt and gravel roofing. Tenders received by architect after February 27th.

London, Ont.

Chairman Board of Works, Ald. Rose, will secure plans and estimates for steam heating system in public comfort station now being erected. Estimated cost $4,000.

Montreal, Que.

Five fire stations, cost $300,000, planned by Board of Control. Secretary, L. N. Senecal. $100,000 has been voted for purchasing apparatus for above stations, one station in St. Anne Ward, Bordeaux, Notre Dame de Grace and two in Longue Point Ward. Pressed brick and cut stone construction, cement foundation, electric lighting.

Alterations and addition to post office, cost $15,000, planned by municipal council, Lachine. Extension to present building of 40 x 35, new main entrance and several alterations. One storey, 40 x 35, cut stone and pressed brick construction, felt and gravel roofing. Plans will be prepared.

New Westminster, B.C.

Addition to post office, cost $45,000. Dom. Govt. Dept. of Public Works. Sec., R. C. Desrochers, Ottawa. Building to be 4-storeys, 45 ft. in width. Plans in progress.

Ottawa, Ont.

Girls' home, for Travellers' Aid Society. Supt., Miss Emilie Marshall, 380 King Edward. Plans will be prepared.

Church, cost $30,000, Division, 48 x 66, for Italian Church Brethren, c/o Rev. Fr. Fortunatus, Italian Mission, Murray street, Ottawa, Plans will be prepared.

Home for Friendless Women, Turner street. Sec., Mrs. Geo. Greene, 320 Waverley street. Architect, C. J. Burritt, 193 Sparks street. Three storeys and basement, 73 x 40, laundry 45 x 30, solid brick construction, cement foundation, laundry fittings and machinery. Plans in progress.

Port Arthur, Ont.

Armoury, cost $100,000, Secord and Park streets. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Architect, H. E. Matthews, Bank of Nova Scotia Building, Winnipeg. Tenders received by Secretary until March 4th. Plans, specifications, etc., at office of City Clerk, Port Arthur, office of Architect, Winnipeg, and at Dept. Ottawa. Specifications also at MacLean Daily Reports, Toronto. Extended time.

Prince Albert, Sask.

Club rooms, gymnasium, etc., cost $75,000, River street west, contemplated. Probable architects, Creighton & Crowther. Three storeys, swimming tank, 75 x 30, shower baths, bowling alleys, complete gymnasium equipment required. Address A. J. Manville.

Rock Island, Que.

Municipal building contemplated. Architect, Jas. T. Ball, Boston, Mass. Preliminary plans have been prepared and are considered by the Municipal Council.

Regina, Sask.

Fire hall, cost $16,000. Clerk, A. W. Pool. Architects, Storey & Van Egmond, Credit Foncier Bldg. By-law to be voted on about March 1. Two stys., 2-door fire hall, including furniture, fire alarm gong, equipment and sundries.

Police station, cost $150,000, 23 cells, Osler street. Clerk, A. W. Pool. Architect, Mr. Fulton, Strathcona Block. 3-storeys, 100 x 75, terra cotta and brick construction, fireproof floors, felt and gravel roofing. By-law to be voted on about March 1. Work will commence next spring.

School, Block 56 Belvedere, planned by City Council. Clerk, A. W. Pool. Plans, specifications, etc., at office of architect, J. H. Puntin, 308 Darke Bldg., who will receive tenders until March 5, for work and materials in all trades except plumbing, heating and ventilating.

Richmond, Que.

Immigration shelter planned for G. T. Ry. Co., McGill street, Montreal. Architect, company's engineer, Montreal.

St. John, N.B.

Alterations and addition to court house and offices, cost $100,000, contemplated by City Council. Mayor, J. H. Frink. Commissioner, Miles Agar. 3-storeys, stone construction. Plans will be prepared.

St. John, N.B.

Sunday school building, cost $25,000, for Germain Street United Baptist Church. Pastor, F. S. Potter, Queen St. Architect, Cromer, New York. Associate Architect, F. Neil Brodie, 42 Princess street. Plans in progress.

Steelton, Ont.

Fire Hall, cost $11,000, Wallace Terrace, contemplated by the Town Council. Town Engineer, W. B. Redfern. About $4,000 will be spent on equipment.

Toronto, Ont.

Theatre, cost $10,000, Queen street E. for Jas. Thompson (in trust) 43 Victoria street. One storey, 32 x 96, brick foundation, structural steel and brick construction, felt and gravel roofing. Plans drawn.

Church, cost $50,000, cor. Gladstone ave. and Shanly street, for St. Anthonys Congregation. Pastor, Rev. J. J. McGrand, 126 Bartlett ave. Present building nearly paid off and the remaining part of structure above foundation will be commenced shortly, cut stone and brick construction. Plans ready.

School, cost $8,000, for Scarborough Village, planned by the Scarborough School Board. Secretary, Albert Chester.

Vancouver, B.C.

Transportation Bldg., Hastings Park. Clerk, Wm. McQueen. Architect, Otto Moberg, 423 Hamilton street. 144 x 316, stucco interior on metal lath. Plans ready and tenders will be called.

Poultry Bldg., Hastings Park. Clerk, Wm. McQueen. Architects, Stuart & White, 837 Hastings street west. 56 x 160, frame, exterior shingled, 18-ft. balcony on all sides of the interior. Plans were selected in competition.

Westboro, Ont.

Hall, cost $10,000, contemplated [illegible] Lodge 436 of I.O.O.F., per Secretary Westboro. Architect not decided. Three storeys.

Welland, Ont.

Sunday school, cost $7,000, Muir St., for Methodist Church Congregation. Secretary, C. H. Reilly. Architects, A. [illegible] Nicholson, St. Catharines, Ont., and F. R. Badgeley, of Badgeley & Nicklas, 6110 Euclid ave., Cleveland, O., are preparing plans.

Addition to High School, cost $50,000, West Main street. Secretary, W. H. Lowe. Chairman, A. J. J. Brennan Architects, Corrigall & Forbes, Temple Bldg., are preparing plans. It has been decided to build an addition of 6 rooms and gymnasium to old building.

Winnipeg, Man.

Temple, cost $75,000, Young street, for The Royal Templars of Temperance, head office 316½ Donald street. Plans will be prepared.

Moving picture theatre, cost $10,000, on Transcona. Architect, E. D. Tuttle, 701 McArthur Bldg., Winnipeg, wishes to get in touch with people who construct this class of building. Plans in progress.

CONTRACTS AWARDED

Hamilton, Ont.

Pavilion and band stand, cost $10,000, Dundurn Park. Architect, E. B. Patterson, 167½ King street east. Carpenter, Geo. Burkholder, 87 Augusta street. Iron and steel, Hamilton Bridge Works Co., Barton and Bay streets. Contract for cement work to be awarded later. Secretary, A. P. Kappele, City Hall.

Montreal, Que.

School, cost $150,000, Bourassa, for Parish of Ste. Clothilde. Architects, MacDuff & Lemieux, Merchants Bank Bldg., St. Catherine west. Masonry, Filion Frere, 865 De St. Valier street. Carpentry, Jos. Marcotte, 29 Salaberry Apts. Iron and steel, Dominion Bridge Co., Lachine. Roofing, painting and plumbing, Rea & Skead, 1074 St. James. Electrical work, F. X. Gaillevin, 1088 St. James street. Four storeys, 208 x 58, cut stone and grey brick construction.

Club house for University Settlement Club, cor. Oliver and Western. Architect, Prof. Ludlow, McGill University, Montreal. General contractor, masonry, carpentry and painting, Wm. Laird, 18 McGill College ave., Montreal.

Regina, Sask.

Government House to be erected on north side of Wascana Lake between Broad street and the lake. Provincial Government, Dept. of Public Works. Acting Deputy Minister, H. S. Carpenter. Architects, E. & W. S. Maxwell, 6 Beaver Hall Square, Montreal. Plans prepared.

Ste. Therese, Que.

Public building. Dom. Govt., Dept of Public Works. Secretary, R. C. Desrochers, Ottawa. Contractors, Jos. Lalonde, Argenteuil, and O. B. Lafleur & Son, Ltd., Lachute, Que.

Scarboro, Ont.

School, $7,000, Sec. No. 9. Owner, Trustee Board. Architects, Munroe & Mead, Chancery Chambers, Hamilton. One storey, 80 x 40, cement foundation, stone and pressed brick construction, [illegible] sheet metal, steam heating, open plumbing, weather strips, ventilating system, boilers.

Toronto, Ont.

Theatre, cost $12,200, Gerrard St., for J. A. Gallagher, Broadview and Langley ave. Contractors, [illegible] brick foundation, [illegible] steel construction.

[illegible] College, [illegible] Provincial Govt., Dept. of Public Works. Secretary, H. F. McNaughton, Parliament Bldgs. Roofing, McLeod & Webb, at building. Heating, ventilating and plumbing, Purdy Mansell, Ltd., 63 Albert street. Electrical, Bennett & Wright Co., 72 Queen street east. Plastering, A. D. Grant, 5 Grenadier Road.

Church for Simpson Ave. Methodists. Pastor, Rev. E. E. Scott, 28 Simpson ave. Architect, E. G. Wilson, 77 Victoria street. Masons and carpenters, Skipper Bros., 399 Curzon street. Plastering, T. Blackburn & Sons, 208 Broadview ave. Stone and brick foundation, cut stone and brick construction.

Villeray, Que.

Fire Station, cost $20,000, planned by the Municipal Council. Builders and general contractors, T. Lessard & Sons, 191 Craig street east, Montreal. Two storeys, 50 x 100, cut stone and pressed brick construction, felt and gravel rfg

Winnipeg, Man.

Church, $7,500, College ave. Owners, Lutheran Emanuel Congregation. General contractor, M. Hehn, 476 Magnus ave. One storey, 36 x 66, stone foundation, frame construction.

Business Buildings and Industrial Plants

Edmonton, Alta.

Extension to store, cost $40,000, for Y. S. Armstrong. Architects, Magoon & MacDonald, Credit Foncier Block. 5-storeys, cement foundation, brick construction. Plans ready.

Store, cost $370,000, Third street, for W. B. Sherman, 6th ave. and 1st street west, Calgary, Alta. Architects, H. L. Stevenson & Co., 119 Pender street W., Vancouver, B.C. and Calgary, have prepared plans. Six storeys, 118 x 160, cement foundation, reinforced concrete construction. Excavation will commence as soon as weather permits.

Warehouse, 4th street, for Revillion Bros., 547 2nd street. Architect, L. C. Fainhan, has prepared plans. One sty., 100 x 135, cement foundation, brick construction. Foundations started.

Hamilton, Ont.

Lumber mill, cost $6,500, Mountain Top, for A. A. Lees, 47½ King street E. Site has been purchased and plans will be prepared.

Candy factory, East end, for Robert Hyslop, 151 King street east. Architect, Stewart McPhie, Bank of Hamilton Bldg., is preparing plans.

Hamilton, Ont.

Addition to [illegible] B. Greening Wire Co., Napier street Architects, Prack & Perrin, 36 James St S. Tenders to be called shortly. One [illegible] reinforced concrete and structural steel construction, cement foundation.

Montreal, Que.

The Associated Stores Company plan altering Ogilvy Bldg., St. Catherine St., into individual stores. Five storeys, 80 x 150, cut stone construction, cement foundation, felt and gravel roofing. Manager, N. H. Truett. Architect, The House of Browne, 207 St. James street

Store, 383 St. Paul street, for J. W. Lindsay, 512 St. Catherine street west [illegible] start this spring.

[illegible]

District Bank, 176 St. James street. [illegible] and work will [illegible]

Factory, cost $250,000, Ville la Salle, planned for Canadian Fairbanks-Morse Co., 444 St. James street. Engineers, T. Pringle & Sons, Ltd., 419 Coristine Bldg. Contracts have not yet been awarded. Cement foundation, felt and gravel roofing, electric lighting.

Stores and offices, cost $600,000, St. Catherine street, for H. Drummond, St. Francois Xavier street. Architect, H. C. Stone, 84 St. Francois Xavier street. Iron and steel, Dominion Bridge Co., Lachine. Tenders received by architect until February 28, 1913. Ten storeys, [illegible]

Garage, St. Denis Blvd., planned for Donat St. Jean, 1864 Christope Colombe. Application has been made to the City Council to build.

Oxbow, Sask.

The Bow City Creamery Co., Ltd., contemplates erecting up-to-date creamery this spring. To be operated under government supervision. Cost $6,000.

Swift Current, Sask.

Store, cost $15,000, for the Swift Current Grocery Co. Architect, R. H. Bunyard, Main street, Moose Jaw. One sty. and basement, 75 x 130, cement foundation, brick and reinforced concrete construction, stone trimmed. Tenders received by architect.

Prince Albert, Sask.

Bank building for The Canadian Bank of Commerce, planned. Manager, E. G. Shannon Two storeys, 60 x 100. Contract for superstructure will be awarded in March. Foundations in.

St. John, N.B.

Carriage factory, Paradise Row and Southwark street, for Geo. Murphy, 648 Main street. Site has been purchased and plans will be prepared.

Scotstown, Que.

Bank building, Victoria, planned for Canadian Bank of Commerce, head office, King and Jordan streets, Toronto, Ont. Site purchased; will build in spring.

Sherbrooke, Que.

Factory for the Connecticut Mills Co., Danielsonville, Conn. Vice-president, R. J. Caldwell, care company. Company will manufacture a tape for auto bandages, plant to cost between $300,000 and $400,000. Plans will be prepared.

Toronto, Ont.

Factory, Beverley street, for National Drug Co., 27 Wellington street. Manager, T. A. Henderson. Architects, Prack & Perrine, Hamilton. Stone foundation, brick construction. Plans drawn.

Factory, cost $10,000, for Eastern Rubber Co., Eastern ave. Tenders received by Architects, Chadwick & Beckett, 18 Toronto street, until February 27th. 2 storeys, 110 x 250, cement foundation, brick construction.

Factory, cost $80,000, Hannah avenue, for Brunswick-Balke-Collender Co., 67-9 Adelaide street west. Architect, Jas. L. Havill, Mail Bldg. Four storeys, stone and brick foundation, mill and brick construction. Plans in progress.

Terrebonne, Que.

Summer hotel, cost $8,000, for N. Banks, 134 St. Catherine street west, Montreal Tenders received by architect, A. G. Noseworthy, 814 New Birks Bldg., Montreal, after March 1st. Two storeys, stone foundation, wood construction.

Widdifield Station, Ont.

Explosive manufacturing plant planned for Energite Explosive Co., 506 Power Bldg., Montreal. Managing director, Lionel Kent, Montreal. Plans and further information may be secured from Mr. Kent.

Windsor, Ont.

Factory, two storeys, 125 x 50, for the Remington Arms-Union Metallic Cartridge Co., New York. Company have purchased site of 100 acres and plans will be prepared.

CONTRACTS AWARDED

Brantford, Ont.

Store and residence, cost $3,500, Colborne street, for John Harwood. Architect and general contractor, Ellis Bland. Two storeys, 24 x 50, cement foundation, red clay brick construction.

Edmonton, Alta.

Garage, cost $21,000, 21st street, for the Bellamy Co., 124 Rice street. Architect, James Henderson, Crystal Block. General contractor, M. Hughes, 9th St. Two storeys, 50 x 193, cement foundation, brick construction. Repairing machinery required.

Edmonton, Alta.

Store and residence, cost $7,000, Norton street. Architect and general contractor, Jas. Martel, N. Edmonton. Two storeys, 32 x 70, brick foundation, frame construction.

Addition to hotel, cost $15,000, Norton street. Owner and general contractor, James Martel, North Edmonton. Architect, Nesbitt Langdale. Three stys., 56 x 70, cement foundation, frame construction.

Fredericton, N.B.

Remodelling building, cost $3,000, for Royal Bank of Canada. Architect, Kenneth S. Rea, Beaver Hall Hill Montreal. General contractors, Moses Mitchell. Sub-contractors, R. Chestnut & Sons. Engineer in charge, R. O'Brien.

Hamilton, Ont.

Store, James street north, for Stanley Mills Co., King street east. Architects, Mills & Hutton, Bank of Hamilton Bldg. Steel work and tower, Hamilton Bridge Works Co., Barton and Bay streets.

London, Ont.

Warehouse, cost $20 000, Richmond St. for John Dromgole, Greene Swift Bldg. General contractors, J. Evans & Son, 905 Queens Ave. Three storeys, 40 x 65, stone and cement foundation, white brick construction, felt and gravel roofing.

Montreal, Que.

Stores and residences, cost $9,000, for Pinze & Cote, 1143 Mount Royal ave. E. Builders and general contractors, Guertin & Bouchard, 414 Parthenais street. Three storeys, 25 x 80, stone foundation, stone and solid brick construction, felt and gravel roofing.

Moose Jaw, Sask.

Laundry, cost $100,000, 13th ave., for the Progress Laundry Co. General contractor, W. H. Ellis, Jr., 133 Ominica street east. Three storeys,

Ottawa, Ont.

Stores and warehouse, cost $15,000, York, for Kalib Fanah, care W. E. Noffke, architect, Central Chambers. General contractor, Jno. Alexander, 10 Turgeon. Solid brick construction, cement foundation, felt and gravel roofing.

Garage, cost $5,400, Nelson street, for Dr. J. E. Taggart, 36½ Rideau street. General contractor, E. A. Rivers, 270 Arlington street. 38 x 80, cement foundation, solid brick construction.

Quebec, Que.

Office building, cost $15,000, for Harbor Commissioners. Architect, Thomas R. Peacock, 76 de Salaberry. Work is being done by day labor under supervision of engineer, J. McIntyre. Four storeys, 80 x 50, stone foundation, reinforced concrete, brick and structural steel construction.

St. John, N.B.

Sugar Refinery, cost $1,000,000, Ballast Wharf, for Atlantic Sugar Refinery Co., care L. A. Wilson, Royal Hotel, St. John. Engineer, Henry Holgate, Richelieu Bldg., Montreal. Superintendent of Construction, Jos. F. Stillman, care owners. Excavating started.

Toronto, Ont.

Factory, Richmond and Bathurst sts., for Independent Cloak Co., L. Fluxgold, 553 Queen street west. Architect, I. Feldman, 199 Yonge street. Carpenter, Jas. Hogg, 540 Adelaide street west. Iron and steel, McGregor & McIntyre, Ltd., 73 Pearl street. Four storeys, stone foundation, brick and mill construction.

Factory, cost $70,000, Wilton avenue, for Imperial Optical Co., 1 Adelaide St. Architects, Bond & Smith, 19 Wellington street west. General contractors, Jago & Harris, 17 Queen street east. Heating and plumbing, T. A. Norris, 26 Verral ave. Electrical, A. Alexander, Traders Bank Bldg. Ten storeys, reinforced concrete construction, steel sashes on all windows, all modern conveniences.

Addition to factory for Delaney & Pettitt, 113 Jefferson ave. Architects, Langley & Howland, Continental Life Bldg. Masonry, C. W. Wood & Sons, 611 Manning ave. Brick foundation, structural steel and brick construction.

Factory, cost $30,000, College and Euclid ave., for Crown Tailoring Co., Ltd., 38-40 Adelaide street west. Manager, W. J. Brandham. Architect, C. F. Wagner, 15 Toronto street. Masonry, Teagle & Son, 55 Boswell ave. Four storeys, 30 x 50, stone and cement foundation, brick and structural steel construction, concrete, felt and gravel roofing.

Factory, cost $100,000, King and Dufferin streets, for A. B. Ormsby & Co., Queen and George streets. Builders & general contractors, Wickett Bros., 35 Deer Park Cres. Carpentry, Jas. McKenzie, 447 Gladstone ave. Iron and steel, Toronto Structural Steel Co., Ltd., Atlantic ave. Two storeys, 247 x 260, cement and brick foundation, brick and structural steel construction.

Four stores and offices, cost $7,000, cor. Church and Wilton ave. Owner & builder, W. H. Howard, 19 Englewood ave. Brick, structural steel, brick foundation, felt and gravel roofing.

Addition to factory, cost $35,000, for A. T. Reid & Co., 266 King street west. Architects, Sproatt & Rolph, 90 Yonge street. Masonry, J. A. Wickett Ltd., 77 Victoria street. Five storeys, mill and brick construction, maple floors, felt and gravel roofing. Excavating started.

Vancouver, B.C.

Office and store building, cost $450,000, Pender street, for the North German Lloyd Steamship Line, 585-7 Granville street. Architect, J. S. Pierce, 522 Pender street west. General contractors, C. W. Potbury & Co., 603 Hastings street west. Twelve storeys, 50 x 122, reinforced concrete and terra cotta construction, four high speed passenger elevators.

Winnipeg, Man.

Office building, cost $860,000, for Northern Realties Ltd. Architects, Ross & MacDonald, 928 Union Bank Building. General contractors, Geo. A. Fuller Co., Ltd., 1001 Union Bank Bldg. Thirteen storeys, cement foundation, cut stone, reinforced concrete, structural steel construction.

Residences

Chatham, Ont.

Four residences and one store, cost $12,000, for J. S. Glover, 129 Raleigh St. Plans in progress.

Hamilton, Ont.

Residence, cost $25,000, Queen street, for J. W. Lamoreaux, 26 Canada street. Architects, Munro & Mead, Chancery Chambers. Two storeys and attic, 40 x 40, cement foundation, white stone and brick construction. Plans in progress.

Kelowna, B.C.

Residence, cost $6,000, for W. C. Renfrew. Architect, Jas. L. Havill, Mail Bldg., Toronto. Cement piers, frame & shingle construction. Plans drawn.

London, Ont.

Residence, cost $10,000, for Mr. Boaker, manager, Dominion Bank. Architects, Watt & Blackwell, Bank of Toronto Bldg. Two storeys and basement, 32 x 42, brick construction, cement foundation. Plans in progress.

Ottawa, Ont.

Apartments, cost $12,000, for V. Bang, Cooper street. Architect, W. Herbert George, Castle Bldg., Queen street. Brick veneer construction, stone foundation, felt and gravel roofing. Plans in progress.

Portage la Prairie, Man.

Plumbing, heating and electric work for residence for F. G. Taylor, 44 3rd St. N.W. Specifications at office of architect, H. G. Holman, Room 11 Jordan Bldg., Winnipeg, who will receive tenders till March 1, 1913.

Toronto, Ont.

One detached residence, cost $[illegible], Geary ave., for J. Brackley, 998 Dovercourt road. Architect, T. Crouch, care oyner. Two storeys, 30 x 33, brick foundation and construction. Plans drawn.

One detached residence, cost $4,000, Bellwoods ave., for Messrs. Pike & Sigel, 35 Henry. Architect, R. G. Bainridge, 163 Stanley [illegible] storeys, [illegible] brick foundation and construction. Plans drawn.

Residence, cost $10,000, Dale [illegible], for Mrs. N. F. Mann, care architects, Chadwick & Beckett, 18 Toronto street. Tenders received at their office until February 27th. 2½ storeys, 40 x 50, stone foundation, brick construction.

Four attached residences, Queen St. for Stennett Bros., Queen and Kippendavie ave. Architects, Mallory & Thatcher, 31 Queen street west, have prepared plans. Stone foundation, brick construction.

Alterations to residence, cost $4,000, Rusholme Road, for R. W. Campbell, 163 Rusholme Road. Tenders received by architects, Edwards & Saunders, 18 Toronto street. Brick foundation.

Residence, cost $5,000, 606 Huron St., for T. A. Welch, 304 Queen street W. Architect, F. A. Berry, 1107 College St. Three storeys, 18 x 61, brick foundation and construction. Plans drawn.

Weston, Ont.

Residence, cost $4,500, for E. F. Burton. Architect, J. J. Beck, Traders Bank Bldg., Toronto. 2½ storeys, brick construction and foundation. Plans in progress.

CONTRACTS AWARDED

Drummondville, Que.

Apartment house for N. Garceau. General contractors, M. Nadeau & Sons. 1 storey addition.

Edmonton, Alta.

Residence, cost $5,000. Architect and general contractor, E. J. Jost, Room 10 Robinson Block. Two storeys, 30 x 40, cement foundation, frame construction.

Hamilton, Ont.

Twenty-five residences, cost $50,000, east end. Owners and builders, Crompton & Crompton, Bank of Hamilton Bldg. Stone foundation, stock brick construction.

Ten residences, cost $30,000, Carrick and Barnesdale streets. Owner and builder, Henry Durham, 719 Cannon St. E. Stone foundation, stock brick construction.

Lambeth, Ont.

Residence, cost $4,500. Architect and builder, George Kelly. 1½ storeys, stone and cement foundation, brick construction.

Montreal, Que.

Residence, cost $4,000, Ponsard. Owner and builder, Alfred Pelletier, 1679 Bordeau street. Two storeys, 30 x 40, brick foundation, solid brick construction, felt and gravel roofing.

Residence, cost $5,000, Ahunstic, Somerville ave. Owner and builder, Arthur I. Tolhurst, 2438 Waverly street, Montreal. Two storeys, 32 x 38, stone foundation, pressed brick construction.

Five flats, cost $4,500, Stadacona St Architect and builder, T. Pagian, 408 St. Germain street. Three storeys, 30 x 58, brick construction, cement foundation, felt and gravel roofing.

Residence, cost $[illegible], [illegible] street. Owner and builder, Jean Gauthier, 283 Orleans street. Three storeys, 27 x 45, cement foundation, brick construction, felt and gravel roofing.

[illegible] flats, cost $10,000. Architect & builder, Victor St. Andre, 21 Strathcona street. Three storeys, [illegible] x 75, cement foundation, brick construction, felt and gravel roofing. Plans drawn.

Four flats, cost $4,000, Lasalle avenue, Verdun, for M Archambault, Valleyfield, Que. Architect and general contractor, Isidore Proulx, 109b Galt ave., Montreal. Two storeys, 25 x 42, cement foundation, brick construction, felt and gravel roofing.

Five flats, cost $5,000. Owner and builder, R. E. Gignac, 699 Mentana. 3 storeys, 25 x 50, cement foundation, brick construction, felt and gravel roofing.

Residence, cost $7,000, Westmount. Owner and builder, Geo. E. Blackwell, 4184 St. Catherine street. Two storeys, 50 x 50, cut stone, solid and pressed brick construction.

Residence, cost $8,000, Westmount, for Fritz Curkel, 80 Stanley street. General contractors, Kensington Bldg. Co., 80 Stanley street. Two storeys, 39 x 64, pressed brick construction, cement foundation.

Notre Dame de Grace, Que.

Two residences, cost $5,000, Addington, for F. N. Brazeau, 170 Quesnel St. Builder and general contractor, D. Brazeau, 1392 N tre Dame west. Two stys., 25 x 63, brick construction, cement foundation, felt and gravel roofing.

Two residences, cost $5,000, Melrose ave., for Ernest Hagman, 134 Clarke St. Builder, V. A. G. Day, 69 Clanranald ave. Two storeys, 25 x 33, brick construction, cement foundation, felt and gravel roofing.

Ottawa, Ont.

Three residences, cost $9,000, Concord, for N. D. Porter, Bank street. General contractor, Albert Tubbe, 71 Lees ave. Stone foundation, brick veneer construction.

Apartment house, cost $20,000, Florence street, for D. Fraser, O'Connor St. Architects, Horwood, Taylor & Horwood, Sparks street. General contractor, W. A. Charlebois, 104 Le Breton. Three storeys, 98 x 45, cement foundation, brick veneer construction.

South Edmonton, Alta.

Residence, cost $4,000, 2nd ave. north and 3rd street east. Architect and general contractor, F. Vogel. Two storeys, 24 x 30, brick foundation, frame construction.

Toronto, Ont.

One pair residences, cost $5,000. Owner and builder, Wm. Pickering, 254 Lansdowne ave. 2½ storeys, stone foundation, brick construction.

Three pair residences, cost $15,000, Woodycrest ave. Owners and builders, A. Slatkin and J. Kaufman, 77 Vernon street. Stone foundation, brick construction.

Two detached residences, cost $7,000, Keele street and Algonquin. Owner and builder, Wm. J. S. Tremain, 59 Bousted ave. 2½ storeys, stone foundation, brick construction.

Winnipeg, Man.

Apartment block, cost $[illegible], [illegible] for Mr. J. W. Wheeldon. General contractor, J. Wheeldon, 278 Good street. Stone foundation, brick construction, felt and gravel roofing, three storeys, 31 x 99

Winnipeg, Man.

Parsonage, cost $3,000, College ave., for Lutheran Emanuel Church. General contractor, M. Hehn, 476 Magnus ave

(Continued on page [illegible])

Tenders and For Sale Department

Canadian Pacific Railway Co.

Department of Natural Resources

Tenders for

Concrete Paving

Sealed tenders addressed to the undersigned and endorsed "Tender for Concrete Paving," will be received up to noon of **March 29th, 1913**, [illegible] of a Concrete Paving on the Dams of Lake Newell Reservoir, and amounts to about 11,200 cubic yards of concrete paving and 8,700 cubic yards of gravel base. Construction materials, except forms, and water for concrete, will be supplied by the company. All labor, plant, and materials for forms must be furnished by the contractor.

Plans and specifications and all information may be obtained on application to the undersigned. A deposit of $25 will be required as a guarantee of good faith before plans, etc., will be given out, which will be refunded on the receipt of a bona-fide tender.

All proposals must be accompanied by a certified cheque payable to the undersigned for $5,000, which will be forfeited as liquidated damages should the bidder refuse or neglect to execute the contract to construct the work if awarded to him. Proposals must be made in the form provided. Any alterations thereto, interlineation or qualifying of prices may invalidate the bid.

The right is reserved to reject any or all bids and to waive defects.

A. S. DAWSON, Chief Engineer.
Calgary, Alta., Feb. 14, 1913. 8-9-10

Town of Bowmanville

Province of Ontario

Notice to Contractors

Sealed tenders will be received by the Town Clerk until 8 p.m. on

Wednesday, March 19th, 1913,

for the several works in connection with a Waterworks system and a Sewerage system for the Town:—

Contract A (1)—Laying Water Mains in Town.
Contract A (2)—Laying Sewer Pipes.
Contract B.—Constructing Pump House.
Contract C.—Constructing three Reservoirs.
Contract D.—Furnishing Iron Pipes.
Contract E.—Furnishing Hydrants, Valves, Etc.
Contract G.—Furnishing Electrically Operated Booster Pump.
Contract M.—Laying Gravity Conduit Line about eight miles in length.
Contract S.—Furnishing Sewer Pipes.
Contract X.—Constructing Sewage Disposal Works.

Plans and specifications may be seen at the office of the Engineers, Toronto, on and after Feb. 17th, and at the Town Hall, Bowmanville. No tender necessarily accepted.

S. C. HILLIER, Esq., M.D., Mayor.
JOHN LYLE, Esq., Town Clerk.
CHIPMAN & POWER, Engineers,
8-9 Mail Bldg., Toronto, Ont.

Tenders for Power House Equipment

Sealed tenders registered, and clearly marked on the outside of the envelope, "Tenders for Power-House Equipment," and addressed to the City Commissioners at Regina, Sask., Canada, will be received up until noon of **March 15th, 1913**, for the supply of:—

Boilers

6 500 h.p. water tube boilers, complete with mechanical stokers and internal superheaters for 200 lbs. pressure and 125 degrees Fahrenheit superheat.

Fans and Stack

2 One hundred and thirty-three thousand cubic feet per minute ¾ or ⅞ housings, induced draught fans arranged to discharge through one vertical stack 12 feet in diameter, and 70 feet high from base of fans.

Price to be on equipment erected on foundation built by the City of Regina to contractors' requirements.

Copies of specifications may be had from E. W. Bull, Supt. of Light and Power, Regina, Sask.

A marked cheque for five per cent. of amount of tender, made payable to the City Treasurer, City of Regina, must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

8-9 Superintendent of Light and Power.

Town of Swift Current, Sask.

Tenders for

Cast Iron Pipe and Specials

or

Alternatively Steel Pipe and Specials

The Town Council of the Town of Swift Current are prepared to receive tenders for the supply of the following material:—

Cast Iron or Steel	Tons C.I.	Lin. Feet.
6-in. diam.	141	8566
8-in. diam.	50	2230
10-in. diam.	160	5346
12-in. diam.	249	6214
Totals	600	22356

Cast Iron Pipe Specials, approximately 7 tons, or about 100 pieces.

Specifications and forms of tender may be had on application to the undersigned.

Tenders endorsed "Cast Iron Pipe," or "Steel Pipe," to be lodged with the Secretary-Treasurer not later than noon of **Monday, the 17th of March, 1913.**

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

CITY OF CALGARY

Tenders for Vacuum Street Cleaner

Sealed tenders addressed to the City Commissioners, and marked "Tender for Vacuum Street Cleaner," will be received at the office of the undersigned up to 5 p.m. on **Friday, March 7th, 1913**, for the supply of one Vacuum Street Cleaning Machine for the City of Calgary.

For further particulars as to requirements, specifications, etc., of the machine, communicate with Mr. W. H. Cuddie, Supt. of Street Cleaning, Calgary, Canada.

Any or all tenders not necessarily accepted.

9 J. M. MILLER, City Clerk.

Town of Swift Current, Sask.

Tender for

Sinking Gas Well

The Town Council of the Town of Swift Current are prepared to receive tenders for the sinking of a Gas Well approximately 2,000 feet in depth.

Specifications and forms of tender may be had on application to the undersigned.

A deposit of Ten Dollars ($10) will be required for each copy of the specifications, which will be returned on receipt of a bona fide tender.

Tenders endorsed "Gas Well" and accompanied by a marked cheque for $2,000 to be lodged with the Secretary-Treasurer not later than noon of **Monday, the 17th of March, 1913.**

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

City of Moose Jaw, Sask.

Tenders for

Line Material.

Sealed tenders marked "Tenders for Line Supplies," and addressed to the City Commissioners, Moose Jaw, Sask., will be received up to 12 o'clock noon, **Wednesday, March 5th, 1913**, for the following:—

1. Copper and Iron Wire.
2. Cedar Poles.
3. Fir Cross Arms.
4. Pole Line Hardware.
5. Miscellaneous Line Supplies.

Each tender must be accompanied by an accepted cheque or cash deposit equal to at least five per cent. of the total amount of tender.

Specifications and full information may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw, Sask.

The lowest or any tender not necessarily accepted.

JAMES PASCOE,
L. W. RUNDLETT,
W. F. HEAL, City Commissioners.
Moose Jaw, February 12th, 1913. 8-9

Extension of Time

CONCRETE BRIDGES

Sealed tenders will be received until **Saturday, March 15th**, by Wm. Purvis, Twp. Clerk, Columbus, Ont., for the building of eleven reinforced concrete bridges in the Township of East Whitby.

For plans and specifications apply to the undersigned.

H. GIFFORD, Esq., Reeve,
Cedarvale, Ont.
BOWMAN & CONNOR, Civil Engineers,
8-9-10 36 Toronto St., Toronto, Ont.

Town of Swift Current, Sask.

Tenders for

Gate Valves, Valve Boxes, and Fire Hydrants

The Town Council of the Town of Swift Current are prepared to receive tenders for the supply of the following material:—

37—6-in. Valves and Boxes, 3—8-in. do, 3—10-in. do, 3—12-in. do.

22—6-in. Fire Hydrants.

Specifications and forms of tender may be had on application to the undersigned.

Tenders endorsed "Valves and Hydrants," to be lodged with the Secretary-Treasurer not later than noon of **Monday the 17th of March, 1913**,

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

TOWN OF SARNIA
Province of Ontario

Tenders for Water Works

Sealed tenders registered, and clearly marked on the outside of the envelope "Tender A," "Tender B," etc., as the case may be, and addressed to the Town Clerk, Sarnia, Ont., will be received up to 8 p.m., **Saturday, March 15th, 1913**, for the supply of material and the construction of:—

Contract A.—All labor necessary for laying the force main, and furnishing certain materials therefor.
Contract B.—Furnishing all materials for and constructing pumping station.
Contract C.—Furnishing all materials for and constructing Infiltration Basins Sluiceway.
Contract D.—Furnishing Cast Iron or Steel Water Pipes and Special Castings.
Contract E.—Furnishing Gate Valves, Flexible Joints, Expansion Joints, etc.
Contract F.—Furnishing material for and constructing timber wharf or dock.
Contract G.—Furnishing and erecting Pumping Machinery and accessories.
Contract H.—Furnishing and erecting Boilers and accessories.

Copies of plans, profiles, specifications, instructions to bidders, etc., may be seen at the office of H. A. McLean, Town Engineer, Sarnia, or at the office of Chipman & Power, Toronto, on and after February 1st, 1913.

Persons tendering are notified that tenders will not [illegible] Forms will be mailed upon request to the Engineers.

Dr. J. A. BELL, Mayor.
Dr. W. A. HENDERSON,
Chairman Fire and Water Committee.
Sarnia, Ont., Jan. 29, 1913 6-9

CITY OF BRANTFORD

Tenders for Sewer Pipe

[illegible] to Ald. Sam. Suddaby, Chairman of the Board of Works, in care of the City Clerk, Brantford, Ont., will be received till 12 o'clock noon on **Thursday, March 13th, 1913**, for the supply of Sewer Pipe required by the City of Brantford during 1913.

Specifications may be seen and instructions to bidders and forms of tender obtained on application to the City Engineer.

Each tender must be accompanied by a marked cheque payable to the order of the City Treasurer for the amount called for in the form of tender.

The lowest or any tender not necessarily accepted.

T. HARRY JONES,
City Engineer.
City Hall, Brantford, Ont.,
February 24th, 1913. 9-10

CITY OF SASKATOON

Tenders for

Concrete Sidewalks

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Concrete Sidewalks," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of approximately:—

265,390 square feet of Concrete Walk.
5,700 square feet of Lane Crossings.
28,760 lineal feet of Separate Curb.
22,050 lineal feet of Combined Curb.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

Tenders for

Asphalt and Wagons

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, March 11th, 1913**, for supply of Refined Asphalt, also twelve (12) Asphalt Wagons.

Specifications and tender forms may be obtained upon application at the office of the Purchasing Section, Department of Works, City Hall, Toronto.

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as prescribed by city by-law must be strictly com- [illegible] formal.

[illegible] names of two personal sureties approved by the [illegible] a guarantee company, approved as aforesaid.

The lowest or any tender not necessarily accepted.

H. C. HOCKEN,
Chairman, Board of Control.
City Hall, Toronto,
[illegible] 9

Town of Welland

Tenders for Sidewalks
1913

Tenders are invited for the construction of concrete sidewalks for the present year, the quantity being estimated at about three miles.

Specification and schedules can be seen at the office of Contract Record & Engineering Review, Toronto, and Town Engineer's office, where any other information may be received.

Sealed tenders, fully endorsed, are to be deposited with the Town Clerk, Town Hall, not later than **March 15th**, at 12 noon.

An accepted bank cheque for $700 must accompany each bid. Cheques will be returned to unsuccessful tenderers.

The lowest or any tender not necessarily accepted.

GEORGE R. BOYD, Town Clerk,
H. L. HATT, Chairman,
9-10 R. and B. Committee.

CITY OF SASKATOON

Tenders for Pavements

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Pavement," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of approximately 42,000 square yards of pavement, and 12,800 lineal feet of Concrete Gutter.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, Sask., February 21st, 1913.
9-10-11-12

Department of the Naval Service

Sealed tenders addressed to the undersigned, and endorsed "Tender for the Erection of an Operating House (Type No. 3) in connection with a Wireless Telegraph Station at Port Arthur, Ontario," will be received at this office until noon on **Saturday, March 15th, 1913**.

Plans, specifications, and forms of contract to be entered into, can be seen on and after the 25th inst. at the Office of the Superintendent Radio Telegraph Branch, Department of the Naval Service, Ottawa, or at the Government Wireless Telegraph Station Dawson street, Port Arthur, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an ac- [illegible] the order of the Honorable the Minister of the Naval Service, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be [illegible]

The Department does not bind itself to accept the lowest or any tender.

By order,
G. J. DESBARATS,
[illegible]
[illegible]
36126 [illegible]

Notice

Postponment of Tenders
City of Regina, Sask.
Regina Municipal Railway

[illegible] ately [illegible]

[illegible] paving with top finish [illegible]

[illegible]

R. MARTIN, Mayor,
[illegible] McNEILL,
[illegible] THORNTON,
City Commissioners.

CITY OF SASKATOON

Tenders for Labor on Storm Sewers

[illegible] addressed to the City Commissioners, and endorsed "Tender for Labor on Storm Sewers," will be received up to twelve [illegible] Friday, March 28th, 1913, for the [illegible] 6,525 lineal feet of Storm Sewer; 2,100 lineal feet of Catch Basin Connections, and the construction of Manholes, Catchbasins and Appurtenances.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saska[illegible]

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

Sealed tenders addressed to the undersigned, and endorsed "Tender for Armoury, Port Arthur, Ont.," will be received at this office until 4 p.m. on Tuesday, **March 4, 1913**, for the construction of the building mentioned.

Plans, specification and form of contract can be seen and forms of tender obtained at the office of the City Clerk at Port Arthur, Ont.; at the office of H. E. Matthews, Esq., Superintending Architect of the Dominion Public Buildings, Winnipeg, Man., and at this Department.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be [illegible]

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.
Department of Public Works,
Ottawa, February 17, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—36279. 8-9

County of Haldimand

Road Superintendent

Applications will be received up to and including the **8th of March** for the position of Road Superintendent for the above County. Schedule of the duties may be had on application to the County Clerk, Cayuga.

Applications must be in the handwriting of the applicant, must be sealed and endorsed on the outside "Application" and be addressed to the undersigned.

Applicants should state clearly their experience on road work, their age, whether teetotal or moderate, when ready to assume position, and salary expected, which shall include travelling expenses.

Not more than three names should be given of persons acquainted with the applicant to whom Committee may apply for information.

WILLIAM WALTON,
Chairman County Roads Committee,
8-10 Cayuga, Ont.

Regina Public School Board

Tenders, sealed and endorsed on envelope "Tenders for School Building, Block 56, Belvedere, Regina," will be received by the undersigned up to 12 o'clock noon, **March 5th, 1913**, for work and material in all trades (except plumbing, heating and ventilating) required in the erection and completion of a Public School Building.

Each tender must be accompanied by a marked cheque for five (5) per cent. of the amount of the tender, made payable to the Chairman of the Public School Board; the successful tenderer to have this cheque returned upon furnishing satisfactory bond for ten per cent. of the amount of the contract, conditional for the due and proper performance of the work. The deposit of the unsuccessful tenderers will be returned when the contract is signed.

The right to reject any or all tenders or to waive any defects or irregularities therein, is to be at the discretion of the Board.

Plans, specifications, form of tender and all information may be obtained on application to the undersigned.

J. H. PUNTIN, Architect,
8-9 308 Darke Bldg., Regina, Sask.

Town of North Battleford
Province of Saskatchewan

Water Works, Sewerage Works, and Concrete Sidewalks

Sealed tenders will be received by the Secretary-treasurer of the Town of North Battleford, until 8 p.m., **Tuesday, April 15th, 1913**, for the following works:

Contract A.—Pipelaying on Waterworks and Sewers.
Contract B.—Furnishing Cast Iron and Steel Water Pipes and Specials.
Contract E.—Fire Hydrants and Gate Valves.
Contract S.—Furnishing Vitrified Tile Sewer Pipe and Junctions.
Contract T.—Constructing Concrete Sidewalks and Curbs.

Plans and specifications may be seen at the office of the Engineers, Toronto and Winnipeg, and at the Town Hall, North Battleford, on and after March 17th, 1913.

Lowest or any tender not necessarily accepted.

D. S. WALKER, Esq., Mayor,
North Battleford, Sask.
H. W. DIXON, Esq., Secretary-treas.,
North Battleford, Sask.
CHIPMAN & POWER, Con. Engineers,
9-10 Toronto and Winnipeg.

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f.

Tenders for Supplies

Sealed tenders, registered and clearly marked on the outside of envelope, "Tenders for Electrical Department Supplies," and addressed to the City Commissioners, Regina, Saskatchewan, will be received up until noon of **March 29th, 1913**, for the supply of:—

Section No. 1.—Weatherproof copper wire.
Section No. 2.—Western cedar poles.
Section No. 3.—Cross-arms.
Section No. 4.—Top-pins, insulators, etc.
Section No. 5.—Pole line hardware.
Section No. 6.—Pole type transformers.
Section No. 7.—Integrating watt meters, single, polyphase and two rate.
Section No. 8.—Metal flame arc lamps and station equipment.
Section No. 9.—Series cut-out mast arms for arc lights.
Section No. 10.—Underground material.
Section No. 11.—Fire alarm boxes and gongs.

Price to be F.O.B. Regina.

Copies of specifications may be had from E. W. Bull, Superintendent of Light and Power, Regina, Sask.

A marked cheque covering 5 p.c. (five per cent.) of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
9-10-11-12-13 Supt. of Light & Power.

Sealed tenders addressed to the undersigned, and endorsed "Tender for Customs Building, Ottawa, Ont.," will be received until 4 p.m. on **Monday, March 31, 1913**, for the construction of a Customs Building on Mackenzie Avenue, Ottawa, Ont.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the offices of R. L. Deschamps, Esq., 103 St. Francois Xavier Street, Montreal, and of Thos. Hastings, Esq., Clerk of Works, Postal Station "F," Yonge street, Toronto, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, for the sum of seventy-five thousand dollars ($75,000), which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.
Department of Public Works,
Ottawa, February 17, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—35171. 9-10

Canadian Pacific Railway Company

North Toronto Grade Separation

Notice to Contractors

Sealed proposals will be received by the undersigned up to 12 o'clock noon on Thursday, **March 20**, for the construction of the substructures of subways at Davenport Road, Spadina Road, Howland avenue, and Bathurst street, at North Toronto.

Plans and specifications can be seen at the office of the Engineer of Grade Separation at No. 262 Avenue Road, where proposal forms can also be obtained.

The lowest or any tender not necessarily accepted.

B. RIPLEY,
Engineer of Grade Separation.
Toronto, February 20th, 1913. 9-10

For Sale

Owner leaving country has for disposal at the low price quoted and in perfect condition,

One Transit, complete	$95.00
One 15-in. level, tripod and levellyion ...	65.00

Cases and equipment included.

Reply to Box 712, Contract Record, Toronto, Ont. 8-9

McMyler Derricks For Sale

Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover buckets, two (2) marine engines, boilers, fuel lighter with whirley aboard. Address

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

Wanted At Once

Six or eight second-hand dump cars.
Two and a half inch Steam Drill.
One-yard used Concrete Mixer.
25 h.p. Portable Boiler and Engine.

T. P. ALTIMAS,
9 340 Sparks Street, Ottawa, Ont.

Bush Horses
For Sale

Eight or ten teams good heavy bush horses to be disposed of about the middle of March. Now working at Mowat, on the Canadian Northern Railway.

LAUDER, SPEARS & HOWLAND,
501 [illegible]
Phone M [illegible] 9-10

Situations Wanted

[illegible] wanted. Applications must give detailed ex- [illegible] time job and best pay. Apply A. M. Crain, Box 193, [illegible] 9-11

Contractor's Diver disengaged; requires situation. Have good references. Accustomed to all kinds of pier work, intake and outfall. J. Sweeney, 157 La Salle Avenue, Maisonneuve, P.Q. 9-11

Young engineer (27) wishes position representing good contracting, mining or industrial company in West Indies or Mexico. Two years experience in Mexico. Best of references. Box 713, Contract Record, Toronto, Ont. 8-11

Situation wanted after April 1st. Will be open for engagement as general building foreman or superintendent. A1 estimator and draughtsman. Have planing mill experience. Address Box 718, Contract Record, Toronto, Ont. 9

Situations Vacant

WANTED—Superintendent for construction work, tracklaying, ballasting, etc. Must be first-class man with unexceptional references. Address Box 720, Contract Record, Toronto, Ont. 9-11

(Continued from page 69)

[illegible], 22 x 28, stone foundation, frame construction.

Power Plants, Electricity and Telephones

Brigden, Ont.

Store owned by R. J. Nicholson burned. New store will be erected in spring, two storeys, to cost $6,000.

London, Ont.

The City Gas Co., 215 Dundas street (J. C. Duffield), are having plans prepared for enlarging gas plant. Equipment required.

Lavaltrie, Que.

Grocery store and residence owned by Osias Miron burned, loss $6,000. Will rebuild. Plate glass, show cases, scales, refrigerator, store fixtures and fronts required.

Moose Jaw, Sask.

Line material required by City Commissioners (James Pascoe, L. W. Rundlett and W. F. Heal). Tenders received by City Commissioners until March 5, 1913, for supply of the following: 1. copper and iron wire; 2. cedar poles; 3. fire cross arms; 4. pole line hardware; 5. miscellaneous line supplies. Specifications, etc., at office of Electrical Superintendent, J. D. Peters.

Oxbow, Sask.

Electric lighting plant, cost $12,000, contemplated by the Town Council. Mayor, H. C. Wylie. Clerk, S. R. Wallace. Storage battery system is most in favor.

Reserve Mines, N.S.

Electrical machinery. Cape Breton Electrical Co., Ltd., Sydney, N.S., will construct distributing sub-station at Reserve Junction. Require 2 250-kw. step-down transformers, 2200 volt, 2-phase, 60 cycle current to a 300-kw. motor generator. A 10-mile transmission line will be built from Sydney power station to [illegible] 2200 volt, 2-phase to 2200 volt, 3-phase transformers, additional switching equipment, also required. Manager, E. Milliken, Electrical Superintendent, J. B. Bulley.

Sherbrooke, Que.

[illegible] for Bell Telephone Co., Notre Dame W. and St. Johns street, Montreal. Tenders received by architect, W. J. Carmichael, Bell Telephone Co., Montreal. Three storeys.

Swift Current, Sask.

Secretary-treasurer will receive tenders until March 17, 1913, for sinking of gas wells, 2,000 feet. Plans, specifications, etc., at office of engineer, Geo. D. Mackie. A. W. Snider, Mayor.

Vancouver, B.C.

Office and telephone Exchange Bldg., cost $300,000, for the B. C. Telephone Co., 555 Seymour street. Ten storeys, 50 x 120. Plans will be prepared.

Winnipeg, Man.

The Board of Control plan the erection of power sub-station No. 3 to take the form of an annex to the terminal station on Rachel street. Secretary, M. Peterson. Engineer, J. G. Glassco, 54 King street.

Transformers, cost $15,725. Engineer, J. G. Glassco, 54 King street. General contractors, The Canadian General Electric Co., 146 Notre Dame ave. Three transformers, 2700 kw. each. Board of Control. Secretary, M. Peterson.

Switchboard, batteries, etc., cost $10,000, for the new fire alarm system., contemplated by Board of Control. Secretary, M. Peterson. City Electrician, F. A. Cambridge, City Hall.

Miscellaneous

Brant Twp., Ont.

Lumber required by Twp. Council. Tenders received by Clerk, M. A. McCallum, Malcolm, Ont., for 15,000 feet of cedar.

Edmonton, Alta.

Fire apparatus. Tenders will be received by Clerk, F. M. C. Crosskill, after March 10, for following: 1. three motor combination chemical and hose wagons, 1 40-gal. chemical tank on each, and 1,200 feet of hose, fully equipped. 2. Two motor combination engine and hose wagons, with pumping capacity of not less than 700 or 750 gals. per minute, with hose bed to carry 1,000 feet of 2½-in standard hose. 3. One motor hook and ladder truck with 50 or 55 ft. extension, fully equipped. 4. One motor 4-wheeled tractor, 90 h.p., for aerial truck. 5. One horse-drawn hose wagon with 1,200 feet of hose, capacity divisional body. 6. 5,000 ft. 2½-in. cotton rubber lined hose 7. 12 Boston play pipes with Callahan cut-off-tips. 8. Eight single 2½-in. cut-off connections. 9. Four steamer cut-off connections. 10. Five brass 2½-in. sliding poles, each about 30 ft. long. Specifications, etc., at office of Fire Chief.

Port Stanley, Ont.

Town Council, Waterworks Department, contemplate purchasing new fire apparatus. Superintendent, Mr. Miller.

Rosthern, Sask.

[illegible] purchase of fire equipment. Mayor, H. W. Weatherly. Clerk, Geo. Braden

Toronto, Ont.

[illegible] the purchase of two new trucks. Mayor, H. C. Hocken, City Hall.

Trenton, Ont.

[illegible]

[illegible] Mayor Dr. Kidd. Clerk, G. W. [illegible]

Westboro, Ont.

[illegible] is contemplated. Secretary-treasurer, W. J. Cairns. Chairman, [illegible] Holloway.

Business Notes

Elgin, N.B.

[illegible] Mercantile Co., Sussex, N.B., burned. President, Simeon [illegible]. Loss $30,000 covered by insurance, will probably rebuild.

Elk Lake, Ont.

The following suffered loss by fire:—A. Kibbie, Matabanick Hotel, $15,000, [illegible] $10,000; [illegible] Trading Co., $3,000, insurance $500; Lang, Jodouin Co. (E. R. Clarkson, liquidator), $4,000; Hudson Bay Co., building and stock, $15,000; Chas. Fung, restaurant, $500; J. R. Booth, branch office, $200; A. M. Daniels, D. C. clerk, $500.

Haileybury, Ont.

Two stores, Georgina and Main Sts., burned. Owned by Herman Kahle. Loss $10,000, insurance $6,500. Will rebuild.

Hamilton, Ont.

Planing mill of J. J. Smith & Sons, Sherman ave., burned. Machinery destroyed, loss between $10,000 and $12,000.

Joliette, Que.

Biscuit factory owned by Joseph Dufresne burned. Loss $50,000. Will re-

Montreal, Que.

Factory of Canadian Rubber Co., Ltd. 955-971 Notre Dame street, burned. Loss $30,000. General manager, Mr. Partridge. Building to be repaired at once. Machinery required.

Ottawa, Ont.

Home on Main street, owned by Oblate Fathers, Alma street, Hull, Que., burned. Loss $20,000. Will rebuild. Solid brick construction, stone foundation.

Prince Albert, Sask.

Business block owned by Ald. T. E. Baker, 1st ave. west, burned. Loss $30,000. Two storeys, including stores, offices, cafe and club. Building insured for $14,000. Will rebuild.

Palmerston, Ont.

"Mansion House," Queen street, burned. Owner, John Boyd, Preston, Ont. Proprietor, Richard Graham.

St. John, N.B.

Carriage factory owned by A. G. Edgecombe, City Road, damaged by fire. Loss $3,500. Insured.

St. Thomas, Ont.

Store at 402 Talbot street owned by Baldwin, Robinson, Ltd., General House Furnishings, burned. Loss to building and stock, $50,000. Insurance $35,000.

Souris, Man.

General store of D. A. Mackenzie & Co., Crescent ave., burned. Damage to building, $20,000, to stock $50,000.

St. Charles, Que.

Nap. Labrie's sawmill burned. Loss $12,000, partly covered by insurance. Will rebuild. New building, frame construction, machinery required, steam plant, water wheels.

Stonewall, Man.

The Stonewall Automobile Club House destroyed by fire, loss $17,000. President, R. M. McLeod, Winnipeg, vice-president, N. J. Breen, Cycel & Furby streets, Winnipeg.

Toronto, Ont.

Car repair shops and storage sheds of Grand Trunk Railway and the Pulman Car Co., foot of John street, burned. Loss between $8,000 and $10,000.

Club house of Parkdale Canoe Club, Sunnyside, burned. Loss $15,000. Insurance, $12,000. Will rebuild. Further information from Wm. Galloway, North American Life, 112 King west.

Wiarton, Ont.

Moore's Novelty Works burned. Machinery damaged. Will rebuild at once.

Wingham, Ont.

Baptist Church burned, loss $7,000. Pastor, Rev. G. V. Collins. To be rebuilt at once.

New Companies

Rocmac Roads Limited, incorporated with a capital of $40,000, to make contracts relating to the making or building of roads, highways, roadbeds, walks, etc., with head office at Toronto. The provisional directors are G. R. Forneret, G. W. Morley and D. A. MacRae, all law students, of Toronto.

London Lumber Company, Limited, has been incorporated with a capital of $40,000, to carry on business as dealers in timber, lumber and wood, with head office at London. The provisional directors are F. E. Harley, lumber dealer, Richard Hoare, gentleman, and C. R. Hoare, bookkeeper, of London.

Standard Lumber Company, Limited, has been incorporated with a capital of $100,000, to carry on business as lumber and pulp manufacturers in all its branches, to build dams, piers, etc., with head office at Sturgeon Falls. The provisional directors are A. G. Robertson, financial agent, J. J. Kew, master printer, and E. R. Maltby, stock broker, of Toronto.

Richards-Wilcox Canadian Company, Limited, has been incorporated with a capital of $70,000, to manufacture builders' hardware, etc., with head office at London. The provisional directors are W. H. Fitch, W. R. Yendall, manufacturers, and L. E. Mighell, all of Aurora.

The Hoyle Lumber Company, Limited, has been incorporated with a capital of $120,000, to manufacture and deal in lumber, timber and all wood products, with head office at Morrisburg. The provisional directors are G. L. Brown, civil engineer, W. A. Brown, Chesterville, and S. J. Martin, of Kemptville.

The Ottawa West Land Company, Limited, has been incorporated with a capital of $500,000, to carry on business as a land and building company, with head office at Ottawa. The provisional directors are Geo. Burn, banker, N. D. Porterm, insurance agent, and W. D. Hogg, barrister, all of Ottawa.

The Mount McKay Building and Realty Company, Limited, has been incorporated, with a capital of $100,000, to deal in all kinds of building material, with head office at Fort William. The provisional directors are N. B. Gerry, Alf. Touchette, merchants, and J. W. Nicholson, contractor, all of Fort William.

The Anglo American Investors, Limited, incorporated with a capital of $40,000, to carry on business as a land and building company, with head office at Toronto. The provisional directors are D. G. M. Galbraith, A. K. Goodman, barristers, and E. G. Joy, law student, all of Toronto.

M. S. Boehm & Company, Limited, incorporated with a capital of $200,000, to erect buildings and deal in building materials, with head office at Toronto. The provisional directors are G. W. Morley, H. E. Manning, law students, and H. E. McKittrick, barrister, all of Toronto.

Brown & Cooper, Limited, have been incorporated with a capital of $40,000, to carry on business as general contractors, with head office at Toronto. The provisional directors are J. J. Brown, R. J. Cooper, contractors, and A. C. Brown, bookkeeper, of Toronto.

Jones & Johnston, Limited, have been incorporated with a capital of $40,000, to carry on business as a land and building company with head office at Guelph. The provisional directors are W. H. Jones, R. G. Johnston and I. J. Shaw, agents, all of Guelph.

Alliance Realty Company, Limited, has been incorporated with a capital of $100,000, to carry on business as a land and building company, with head office at Toronto. The provisional directors are G. W. Morley, H. E. Manning, law students, and J. F. McGregor, accountant, all of Toronto.

Wellington Properties, Limited, have been incorporated with a capital of $200,000, to carry on business as a land and building company, with head office at Toronto. The provisional directors are Alex, McKenzie, bookkeeper, A. T. Davidson, barrister, and Jas. Schiller, student, all of Toronto.

Weston Realty, Limited, has been incorporated with a capital of $40,000, to carry on business as a general land and building company, with head office at Toronto. The provisional directors are Jas. Montgomery, J. G. Shaw and H. P. A. Edge, solicitors, all of Toronto.

The Albert W. Smith Company, Ltd., has been incorporated with a capital of $5,000, to carry on business as contractors, electricians, etc., with head office at Guelph. The provisional directors are A. W. Smith, plumber, and Wm. Montgomery, of Guelph.

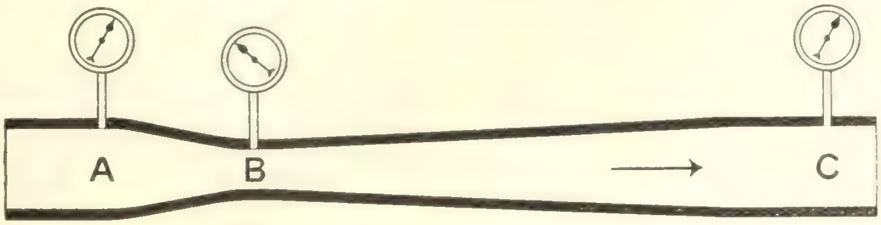
Queen City Pressed Brick Company, Ltd., has been incorporated with a capital of $200,000, to carry on a brick, tile and clay-working business generally, with head office at Toronto. The provisional directors are A. A. Amos, mining engineer, R. A. Olmsted, law student, and G. R. Murton, banker, all of Toronto.

The Renfrew White Granite Company, Limited, has been incorporated with a capital of $180,000, to manufacture and deal in timber, forest products and acquire and operate stone, granite or marble quarries, with head office at Ottawa. The provisional directors are Allan Grauel, of Berlin, A. G. Blair, solicitor, and Dr. A. L. Foster, of Ottawa.

Schaefer Brick Company, Limited, has been incorporated with a cavital of $75,000, to carry on a general brick making business, with head office at New Hamburg. The provisional directors are Fred Schaefer, Morris Schaefer, brick makers, and Valentine Ratz, Senator, all of New Hamburg.

TO TEST CENTRIFUGAL PUMPS

THE "VENTURI" WATER METER BUILT BY **THE BUILDERS' IRON FOUNDRY** IS INDISPENSABLE FOR ACCURATE MEASUREMENTS.



"VENTURI" METER TUBE

Discharge Line from Centrifugal Pumps It is now becoming customary for engineers to specify one or more Venturi Meters in connection with centrifugal pump contracts, and to state in the specifications that the pump will be rated by the Meter. It is a source of satisfaction to the purchaser and the pump manufacturer to prove that the guarantees have been filled.

The performance of this type of pump frequently deteriorates after several months of service; this may be due to the wearing or pitting of the propeller vanes, foreign objects in the interior, or other causes. The Venturi Meter when used with a centrifugal pump has frequently revealed an unsuspected falling off in pump efficiency, and investigation has disclosed the necessity of thoroughly overhauling the pump. Such loss otherwise might have gone on for months without discovery. The meter also enables the superintending engineer to determine just what combinations of speed and head pumped against are the most efficient under actual conditions of service. For other applications

See Bulletin 75

THE JOHN McDOUGALL CALEDONIAN IRON WORKS CO., LIMITED

Works: Seigneurs & William Sts., MONTREAL Sales Offices; MONTREAL, TORONTO, COBALT, WINNIPEG, CALGARY, VANCOUVER

Manufacturers of Boilers, Castings, Condensers, Elevators, Engines, Filters, Forgings, Hydraulic Machinery, Pumps, centrifugal and reciprocating, Steam Turbines, Tanks, Water Wheels, Water Works Plants.

Welland's Need of Many Houses

Owing to the location in Welland in recent years of many large industries employing thousands of men,

Owing to the fact that this number of industries is being steadily added to from month to month and thus increasing the army of employed, and

Owing to the fact that large public and municipal works are to be immediately undertaken,

WELLAND Stands in Need To-day of

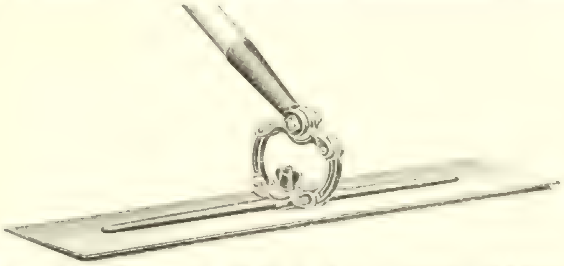
500 HOUSES

The housing demand has reached a point where investment of money on a large scale in the building of homes is certainly safe and profitable.

The undersigned invite the investigation of those with money for investment, and will gladly furnish particulars and statistics concerning Welland's housing problem

JOHN GOODWIN, Mayor of Welland.

H. L. HATT, Pres. Board of Trade



24 INCH ABRAM TROWEL

Abram Sidewalk Finishing Too's are the original **Automatic "Wrist Motion" Tools,** and the only Sidewalk tools made having the "Wrist Motion" and long handles. Every Set of "Abram" Tools is sold on the Guarantee that **ONE MAN** can do more work with them than **THREE MEN** can with old style tools. Write today for circular.

ABRAM CEMENT TOOL CO. 105 Ouellette Ave., WINDSOR, ONT.

Tenders

A few dollars spent in advertising your proposals in

The Contract Record

would result in additional competition, which might save your city or town or your client many hundreds of dollars.

RAILWAY CONSTRUCTION PLANT

Hoisting Engines, Horse Powers, Hand Winches, Derricks, Car Wheels, Axles and Boxes, Dump Cars, Rail Cars, Buckets

MARSH & HENTHORN, Limited

Makers of Hoisting Machinery BELLEVILLE, ONT.

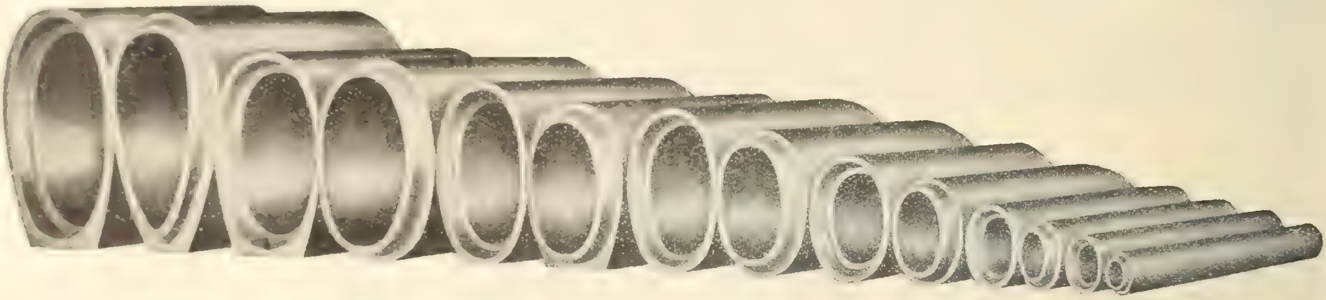
Send for Catalog

SALES AGENTS

MUSSENS

LIMITED

Montreal, Que.



Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

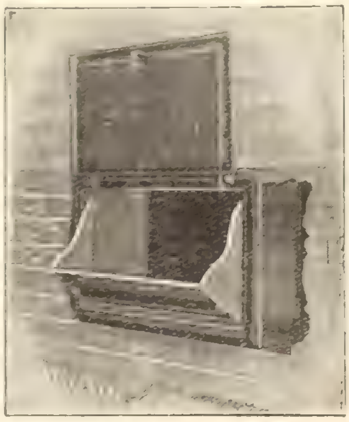
STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario



EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative: E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

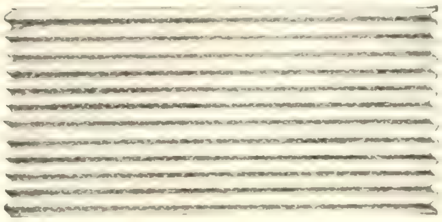
Roof Ornaments and Weather Vanes

Made specially in wrought iron or copper from Architects or our own designs

Dennis Wire & Iron Works Co.
London, Ont. Limited
Toronto Branch : 36 LOMBARD STREET

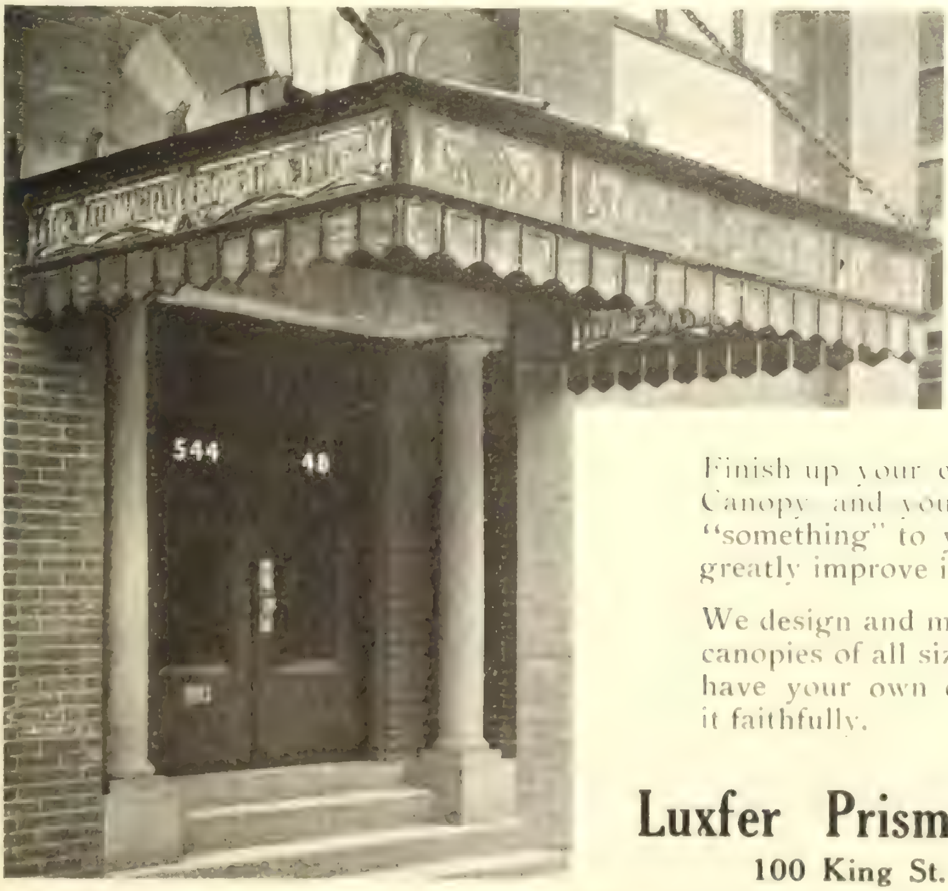
Corrugated Iron

BLACK, PAINTED OR GALVANIZED
Straight or Curved
Stock carried of all gauges, lengths up to 10 feet.



RIDGES FLASHINGS CLEATS BOLTS
and all other necessary sundries.
We Specialize on
Curved Sheets for Concrete Supports

The Metallic Roofing Co., Ltd.
MANUFACTURERS
Toronto, Ont. Winnipeg, Man.



A Luxfer Canopy

Finish up your entrance with a Luxfer Canopy and you will add a distinctive "something" to your building that will greatly improve its appearance.

We design and manufacture leaded glass canopies of all sizes and styles. If you have your own design we will execute it faithfully.

Luxfer Prism Company, Ltd.
100 King St. West, TORONTO

Canadian Made
Steel Dump Cars

Simplest, Strongest, Best

We make 'em in any size
or gauge

We also make Winding Drums and
Portable Track

Bechtels Limited
Waterloo, Ont.

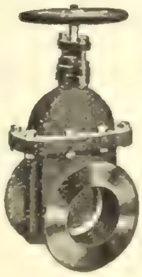
MANNESMANN
SEAMLESS and LAPWELDED
STEEL TUBES
for
Waterworks, Hydro-Electric and Gas Mains,
Well Boring Tubes,
Traction, Trolley and Transmission Poles,
Boiler Tubes and Superheater Tubes.

Write for Booklets.

MANNESMANN TUBE CO., Limited, Montreal
Sole Agents in Canada

KERR VALVES

WATERWORKS



When you buy or specify "KERR" valves and hydrants you know that you are getting reliable goods. Goods with a reputation for long and satisfactory service.

We make valves and hydrants for every branch of municipal waterworks, and for heating system.

What are the requirements of your city or town?

Always specify KERR.

THE KERR ENGINE CO. LIMITED
VALVE AND HYDRANT MANUFACTURERS
WALKERVILLE, ONT.

Wooden Water Pipe

Galvanized Wire Wound and Continuous Stave Pipe
for Water Works, Power, Irrigation, etc.

Withstands 250 lb. working pressure.

Not affected by Frost, Corrosion, Electricity or Acid. Water Works Systems installed. Prompt attention to inquiries.

Write for prices.

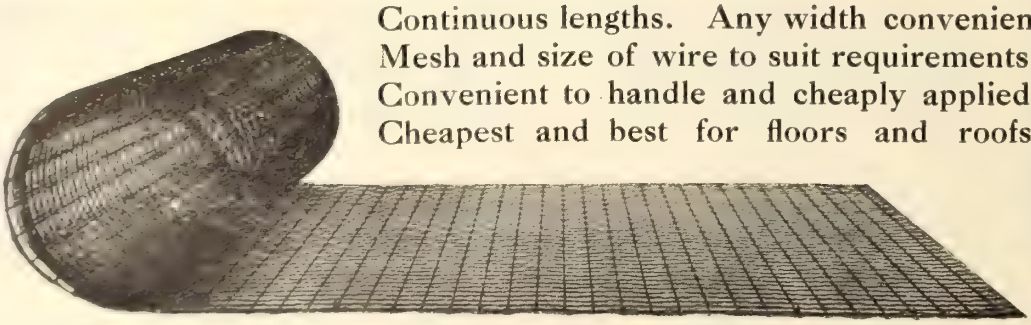
Manufactured by

Canadian Pipe Co., Limited

P.O. BOX 915

Factory: 550 Pacific St., VANCOUVER, B. C.

GREENING'S
Steel Wire Reinforcing



Continuous lengths. Any width convenient to handle.
Mesh and size of wire to suit requirements.
Convenient to handle and cheaply applied.
Cheapest and best for floors and roofs.

WRITE FOR CATALOGUE No. 5.

Wire Rope **Wire Lath**

MANUFACTURED BY

The B. Greening Wire Co. Limited

HAMILTON, Ont. - **MONTREAL, Que.**

BEATTY HOISTS

STEAM OR ELECTRIC

Derrick Car placing 100 foot Deck Plate Girder Span in Missinabi River Bridge on the Transcontinental Railway. The Hamilton Bridge Works Co. together with many other prominent firms favor "Beatty Hoists" for this exacting work.

You cannot see the Hoisting Engine in the picture but it is there, ready at all times and equal to any work it is called upon to do.

This accounts for our receiving the larger portion of orders for engines used on this class of work.

We are equally well able to furnish YOU a Hoist fitted for YOUR individual needs.

May we send you new descriptive matter covering our Engines and Buckets, etc. We'll be glad of the chance.

M. Beatty & Sons
Limited
Welland, Canada

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H. E. Plant, 1790 St. James St., Montreal, Que.
H. W. Petrie, Limited, Toronto, Ont.
Dominion Equipment & Supply Co., Winnipeg, Man.
R. Hamilton & Co., Vancouver, B. C.

Block Stone, Dimensions, Random, Head Sills, Shoddy, Stone Sawing

Sackville Freestone Co., Limited, Sackville, N. B.

WRITE US FOR QUOTATIONS

'Tis Air That Cleans

A Machine,
Not a Machine Shop

You wouldn't think of mowing the lawn with a pair of scissors

Therefore don't think of trying to clean a building of any description with small vacuum cleaning tools.

TUEC tools are large and clean at least in one half time taken by old-fashioned systems.

TUEC

STATIONARY AIR CLEANERS

Canadian Tuec Distributors:

Tuec Co. of Winnipeg, 419 Portage Ave., Winnipeg, Man.
Tuec Co. of Calgary, 812 First Street W., Calgary, Alta.
James J. Martindale, 112 Mail Building, Toronto, Ont.
Tuec Co. of Montreal, 406 New Birks Bldg., Montreal, Que.

Send for Cat. A

Herringbone Lath is Stiff Lath

PUZZLE—
Guess which is the Ribbed Lath.

IT is made with a definite structural design. The ribs and cross filaments each have their special duty, just as the joists and planking do in a warehouse floor. But these ribs have other duties as well. The shape of the cross filaments is such that the most of the mortar forming the clinch pushes through just above the rib. The ribs thus sustain the wet mortar in sufficient quantity to seal entirely around the filaments. This is the reason for the Herringbone perfect key.

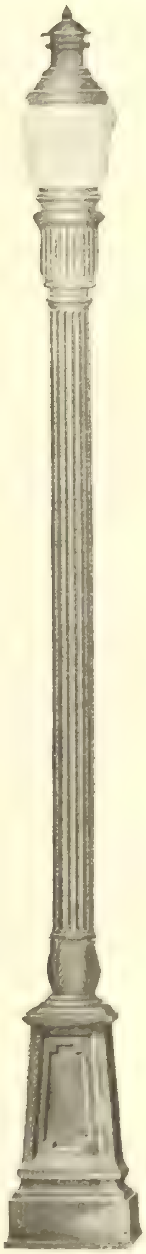
No other metal lath is as good as Herringbone **because no other metal lath has the Herringbone rib.**

Clarence W. Noble, ***General Sales Agent***

117 Home Life Building, TORONTO

Metal Shingle & Siding Company, Manufacturers

MORRIS Street Lighting Poles



Modern Ideas in Street Lighting

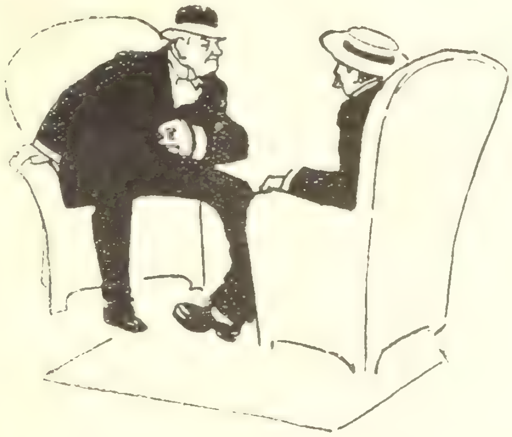
Send for Descriptive Bulletin and Prices

Canadian Distributors

L. H. Gaudry & Co., Ltd
76 Peter St.
QUEBEC, P. Q.

American Agencies Ltd.
Aull Block
CALGARY, ALTA.

A Chat on Sales



If you have salesmen on the road are you paying them to do missionary work, scouting after prospects, when they may work more economically, effectively and on a much larger scale by following the definite leads our reports suggest?

Today, as never before, time is reckoned in dollars and cents. If your salesmen can save hours in searching for prospects, you save capital by coining it into money.

The greatest savers of time, effort and money for the business man of today are MacLean Daily Reports. They are the direct route from the man who is buying to the man who is selling. They enable your salesmen to devote their time in following up business after it has been located, instead of trying to locate it.

Our daily reports will tell you who are buying, what they are buying and when they are buying regarding any building material whatsoever and thus aid you materially in the sale of your products.

Any territory, any line, specialized to your individual requirements. Rates scaled according to the nature of your business and the territory to be covered. Send for our latest booklet and learn how we can help you in your business.

MacLean Daily Reports, Limited
220 King St. West, Toronto, Canada

Current Prices of Building Material.

BRICKS

[illegible] wholesale prices delivered at [illegible]

	Per M
[illegible]	$18 00
[illegible]	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
[illegible] work	12 00
[illegible]	15 00
No. 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

[illegible]

2 in. x 4 in. to 2 in. x 12 in., 8 to [illegible]	$23 00	
[illegible] 16 [illegible]	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
[illegible]	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00
Pine –		
1 in. common pine 8 to 12 in. wide [illegible]	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving	36 00	40 00
[illegible] shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	
Pine trim for paint finish—		
4 in. casing per 100 ft.	2 00	
5 in. casing per 100 ft.	2 25	
8 in. pine base, per 100 ft.	3 25	
10 in. pine base, per 100 ft.	4 25	
4 in. pine window stool	2 75	
[illegible]		
[illegible] Shingles, per M	3 60	
N. B. Extras	3 50	
N. B. Clears	2 90	
No. 1 pine lath, per M.	4 75	
No. 2 pine lath	4 25	
No. 1 spruce lath	4 00	
[illegible]		
5 in. at small end, each	25	
7 in. at small end, each	35	
Hemlock lath	3 25	

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
[illegible]	$4 25	$ 6 25
[illegible]	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
[illegible]	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
[illegible]		12 50

[illegible] F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.30; 1-inch, $1.35; ¾ inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.30 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

Lime, per cwt., delivered, not less than 1,500 lbs 33 cents; white, 43 cents.

Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

PAINT AND OILS

Pure White Lead, ground in oil, $8.75 per 100 lbs.

Boiled Linseed Oil, in bbls., 62c. per gal. of 9 lbs.

Raw Linseed Oil, in bbls., 59c. per gal. of 9 lbs

Turpentine, in barrels, 58c per gallon.

Pure Red Lead, dry $7 to $8 per 100 lbs.

Putty, pure linseed oil, in bulk, bbls., 3½c

Putty, pure linseed oil, in 25-lb. tins, 4c.

Geo. M. Miller & Co.

Architects

Toronto General Trust Building TORONTO

Power & Son,

Architects and Building Surveyors

Merchants Bank Chambers,

Kingston, Canada

FOR SALE

"TAMCO" Crushed Stone in all sizes, for all purposes.
"Roman" building stone.
"Milton" pressed bricks.
Sanitary flooring, stone crushers, fire engines, &c.
T. A. MORRISON & CO.
204 St. James Street,
Tel. Main 4532. Montreal.

TRADE MARK TAMCO

Cement Sidewalk Tools

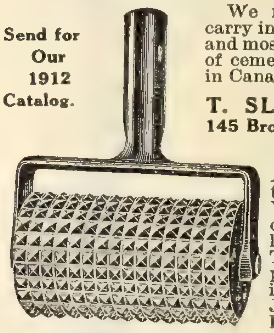
Send for Our 1912 Catalog.

We manufacture and carry in stock the largest and most satisfactory line of cement sidewalk tools in Canada.

T. SLACK & CO.
145 Brock Ave., Toronto

Representatives

A. Bremner, Montreal. Forbes & Van Horn, Vancouver. H.S.Howland, Sons & Co., Toronto. Winnipeg Tool & Forging Co., Winnipeg. J. H. Ashdown, Ltd., Winnipeg.



The Hotchkiss Lock Steel Forms

For sidewalks, street cross-walks, curbs, curb and gutters, driveways, pavements and wall forms. Also fence post and reinforcements.

Special offers for export trade, introductory and demonstrative purposes only.

Write for illustrated folder.

Hotchkiss Lock Metal Form Co.

Dept. S BINGHAMPTON, N.Y

Engines and Boilers

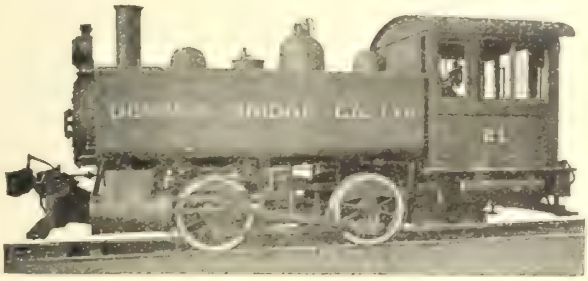
of all types and sizes, Heaters, Tanks, Pumps, etc.

E. Leonard & Sons LONDON ONT.

AGENTS:

MONTREAL ST. JOHN, N. B. WINNIPEG CALGARY VANCOUVER

SELECTION OF LOCOMOTIVES



WHAT SHOULD BE KNOWN BEFORE YOU PURCHASE LOCOMOTIVES.

Nature of the service.
Capacity of the cars and weight of train.
Character of track—is it new or old.
Length of haul.
Is time an important factor.
Do you want a quick locomotive or a big puller.
Distance from base of supplies and quarters for the men.
Water and coal carrying capacity.

All these items and more should be considered. A careful study of conditions may mean larger profits.
Our experience may be valuable in considering them. A dollar saved is more than a dollar earned.
Write or wire us, or better still, come to see us.

MONTREAL LOCOMOTIVE WORKS, LIMITED

Rooms 702-704 Dominion Express Building, MONTREAL, Canada

Cumberland County Quarries

Red and Grey Freestone

Oakley Myers, Amherst, N.S.

Hardens with Age. Low Price. Samples and Quotations Free

Crushed Stone, Limited

STONE of any Size and in any Quantity on hand for Sidewalks, Roadwork or Concrete Work

Works :
Kirkfield, Ont.
Phone Main 4516

Head Office :
47 Yonge St. Arcade, TORONTO
G. W. ESSERY, Manager

Steel and Wood **TANKS**

Suitable for Sprinkler Systems Fire Protection, Water Supply Plants, etc.

Steel Substructures of all kinds
(Galvanized or Painted)

Windmills, Gasoline Engines, Hydraulic Rams, Etc.

Ontario Wind Engine & Pump Co.
Limited
TORONTO WINNIPEG CALGARY

THE TEST

The first Creosoted Wood Block Pavement laid in America was on Tremont Street, Boston, Massachusetts, twelve years ago.

This pavement was laid to secure a test of the wearing qualities of Wood Block.

The street was paved, partly with Asphalt of standard construction and partly with Creosoted Wood Block.

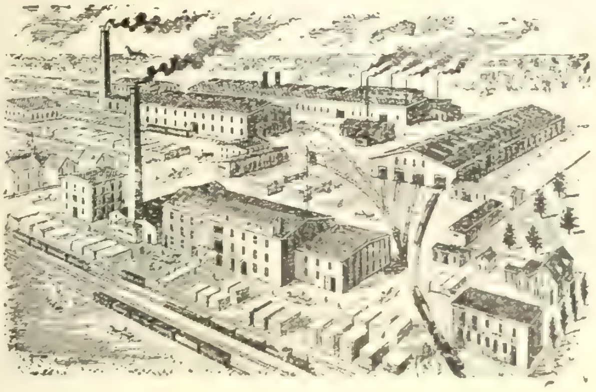
The Asphalt was taken up some time ago and street newly paved.

The guarantee has long since expired on the Creosoted Wood Block but the pavement is as good as ever, the surface wear is scarcely apparent, and it will be many years before repairs are necessary.

We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

The Dominion Creosoting Co., Ltd.
Vancouver, B. C.

Rhodes, Curry Co., Limited
Lessees



Bank and Office Fittings
SCHOOL DESKS A SPECIALTY

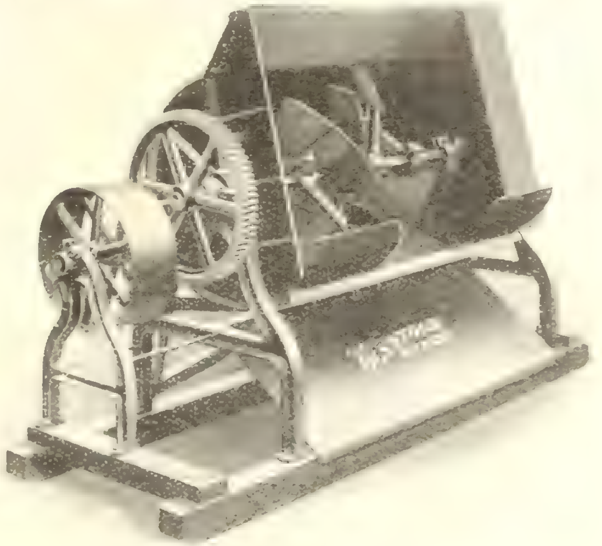
We manufacture all kinds of building materials, including cast iron columns, cresting, sash weights, etc.

In addition to our large stock of native lumber, we are now carrying about one million feet of foreign lumber, including oak, walnut, ebony, whitewood, basswood, red cedar, Douglas fir, mahogany, &c.

Rhodes, Curry Co., Ltd. Amherst, N. S.

BRANCHES AT
Halifax Sydney

The Best Service at Lowest Cost



The Blystone Skid Mixer

The perfect design and construction of this mixer reduces the working cost to a minimum and effects the greatest ease in operation. All working parts are strongly made and will not get out of order.

Easy to work – Easy to Clean High efficiency Low cost

SEND FOR PARTICULARS

The Blystone Machinery Company
61 Railroad St., CAMBRIDGE SPRINGS, Pa., U.S.A.

Full line of Blystone Mixers carried in stock by
The A. R. WILLIAMS MACHINERY COMPANY, Limited
Contractors Department No. 1, TORONTO, CAN.
Sole Distributors for Canada

For Permanent Walls and Roofs at Lowest Cost Use

Asbestos Corrugated Sheathing

For Freight Sheds, Elevators, Warehouses, Mills, Rinks and buildings of this kind, the least expensive permanent roofing and siding is undoubtedly Asbestos Corrugated Sheathing.

It can be attached directly to steel or wooden framing making a rigid wall without the expense of sheathing the frame with lumber.

Asbestos Corrugated Sheathing is made only of Portland Cement and Asbestos. The sheets are formed separately between steel plates, under enormous pressure, making them true to pattern and very dense and hard.

Asbestos Corrugated Sheathing is absolutely waterproof and fireproof. Containing no metal it cannot rust, nor does it require any paint. It grows harder and tougher with exposure and at a very moderate first cost it makes a building which, so far as outside covering is concerned, is practically everlasting.

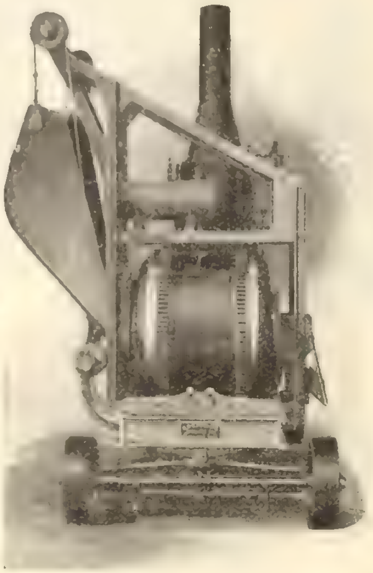
Write for booklet C. R., which gives sizes, shipping weight, covering capacity and methods of application, to

Asbestos Manufacturing Co., Limited

Address E. T. Bank Building, Montreal Factory at Lachine, Que.

The Mixer That Lasts

The Koehring "3 in 1"



We know that concrete mixers get hard service—and so we build THE KOEHRING to *stand* hard service.

We do it by putting the right kind of material into every part of THE KOEHRING—and *enough* material.

Its truck, for instance, is very rugged; it is made with a full 100% safety factor of strength.

Then there are features of design that add greatly to its lasting qualities.

For instance the rollers in THE KOEHRING are keyed onto the shaft *exactly as in a railroad truck*, preventing rapid wear of trunnion rollers and runaways and disalignment of drum, the cause of so many mixer troubles.

Our very complete side loader can be raised to an almost vertical position, so discharging into the drum *without pounding the bucket.*

Don't buy until you have investigated all these detailed superiorities of THE KOEHRING The few points outlined here are but indications of the many you should know about.

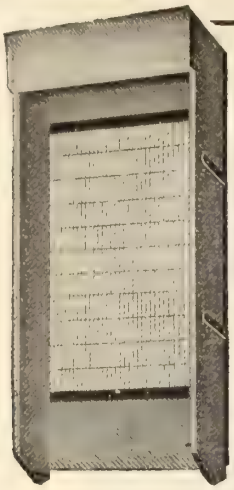
The Koehring "3 in 1" Mixer Book No. 18 Gives Full Details

Glad to send you a copy

Koehring Machine Co.

Milwaukee, Wisconsin

[illegible] Agents for Canada: CANADA FOUNDRY CO
LIMITED—Toronto, Montreal, Halifax, Ottawa, Cobalt,
Winnipeg, Calgary, Vancouver, Nelson.



NOW is the time to renew your

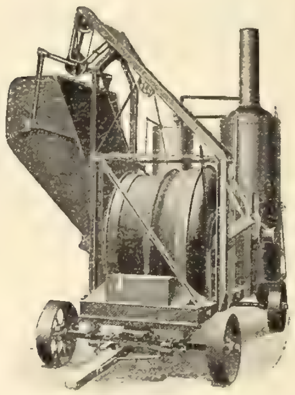
SAND and GRAVEL SCREENS

We make **SCREENS** for all purposes

Concrete Reinforcement, Window Guards, General Wire and Ironwork.

Shall be pleased to quote you.

Canada Wire & Iron Goods Co.
Hamilton



CHAIN BELT MIXER

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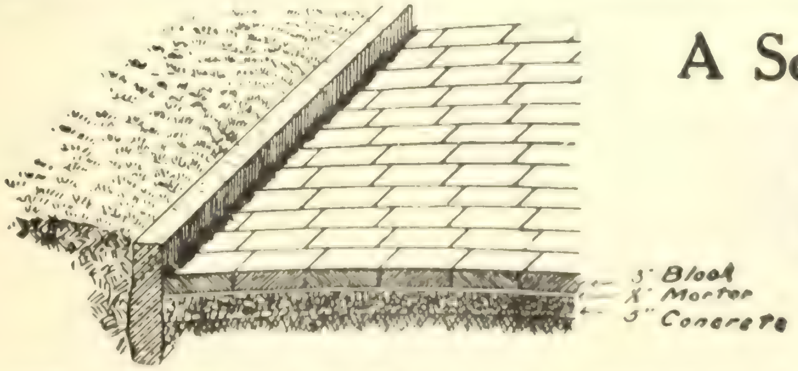

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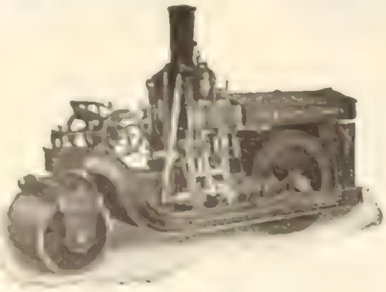

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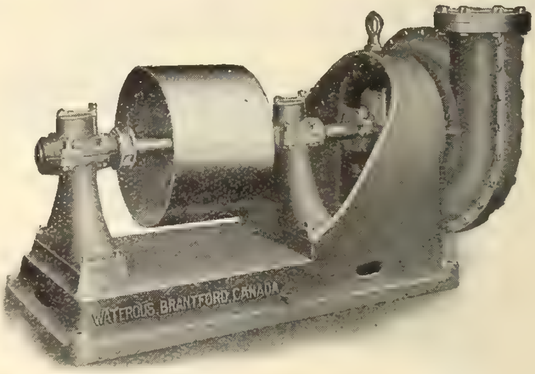

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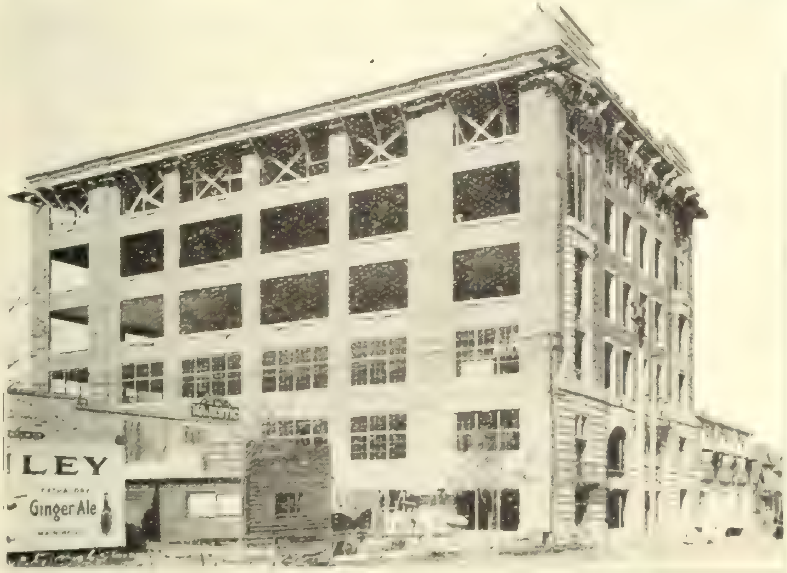

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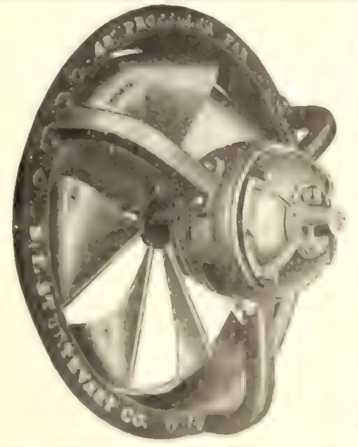

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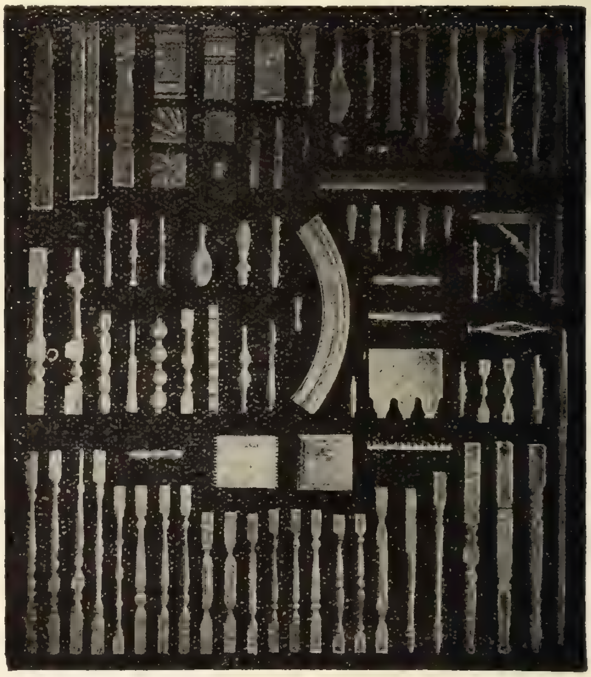

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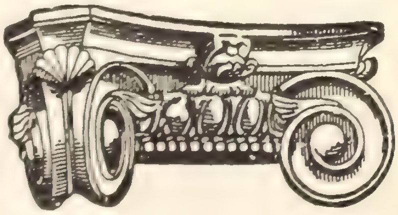

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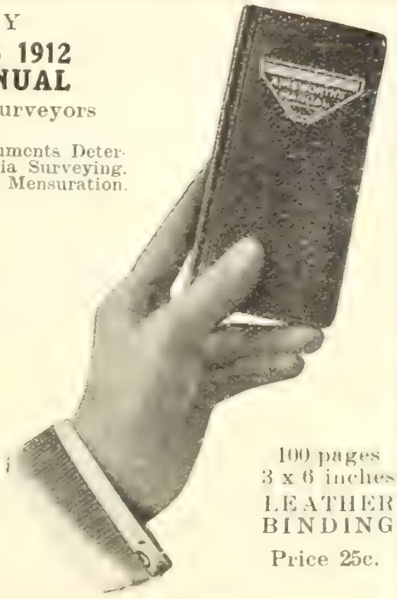

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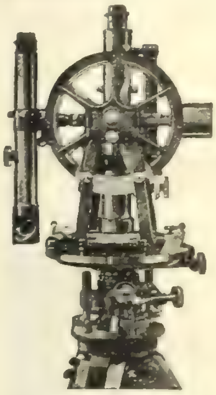

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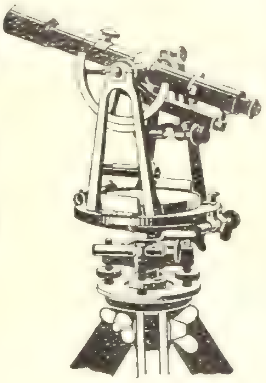

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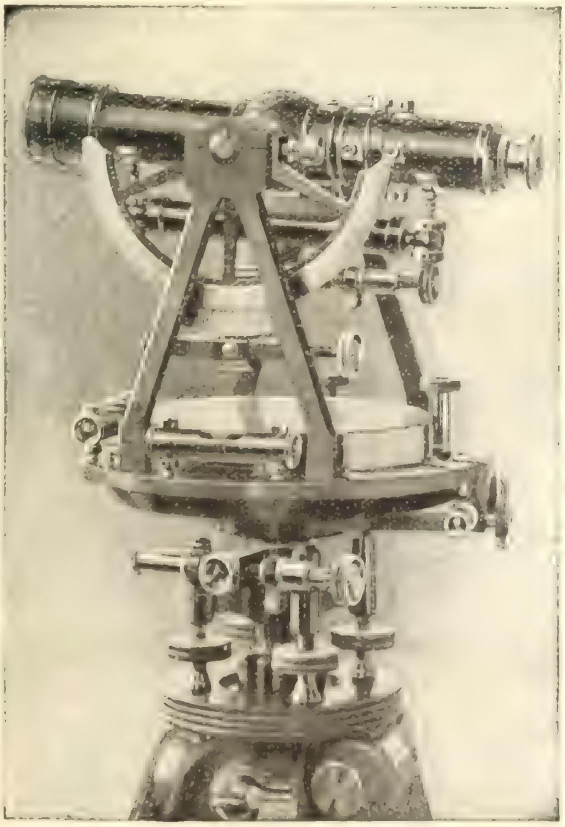

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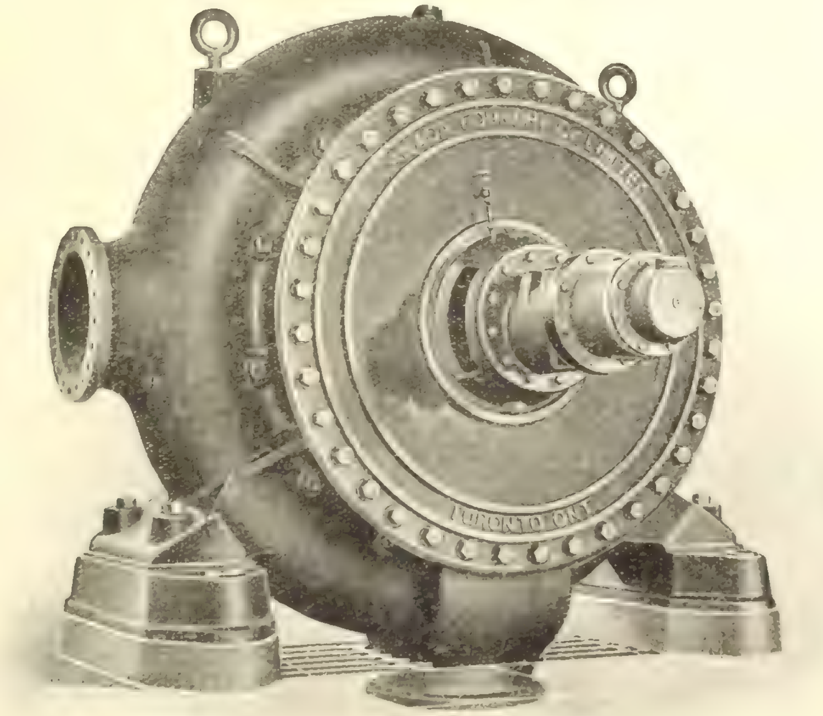

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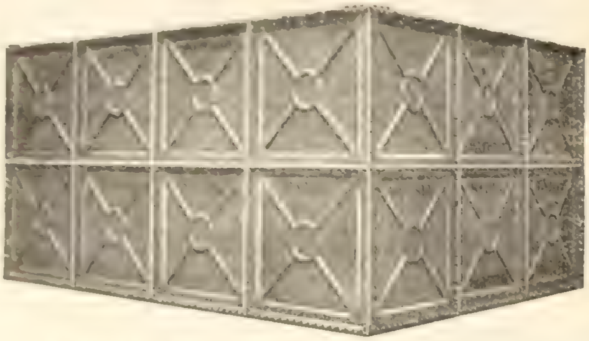

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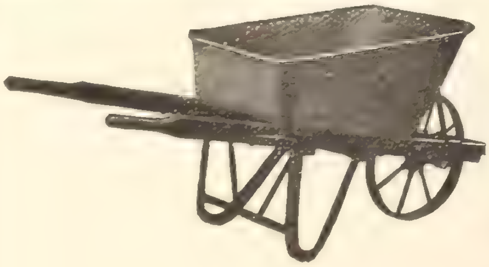

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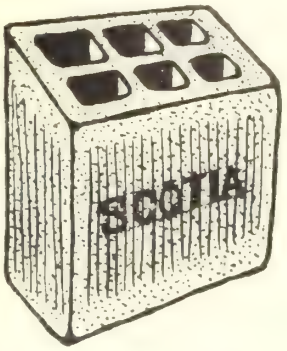

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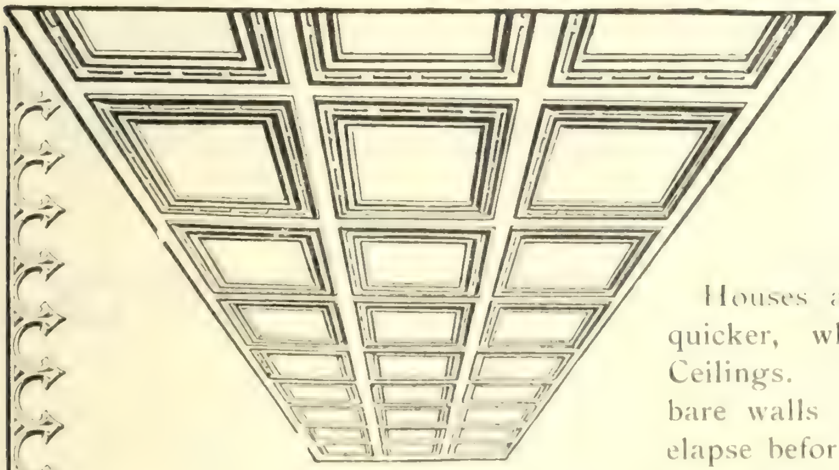

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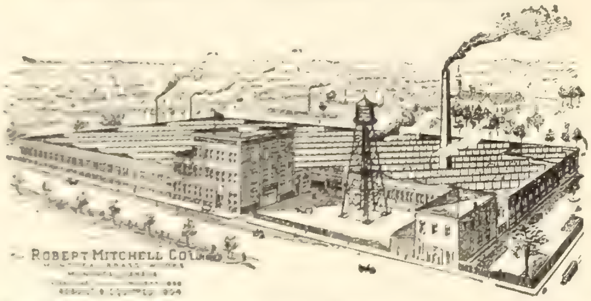
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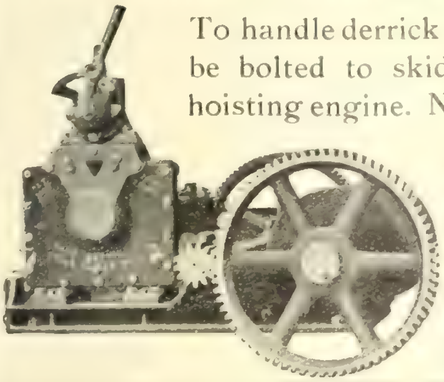

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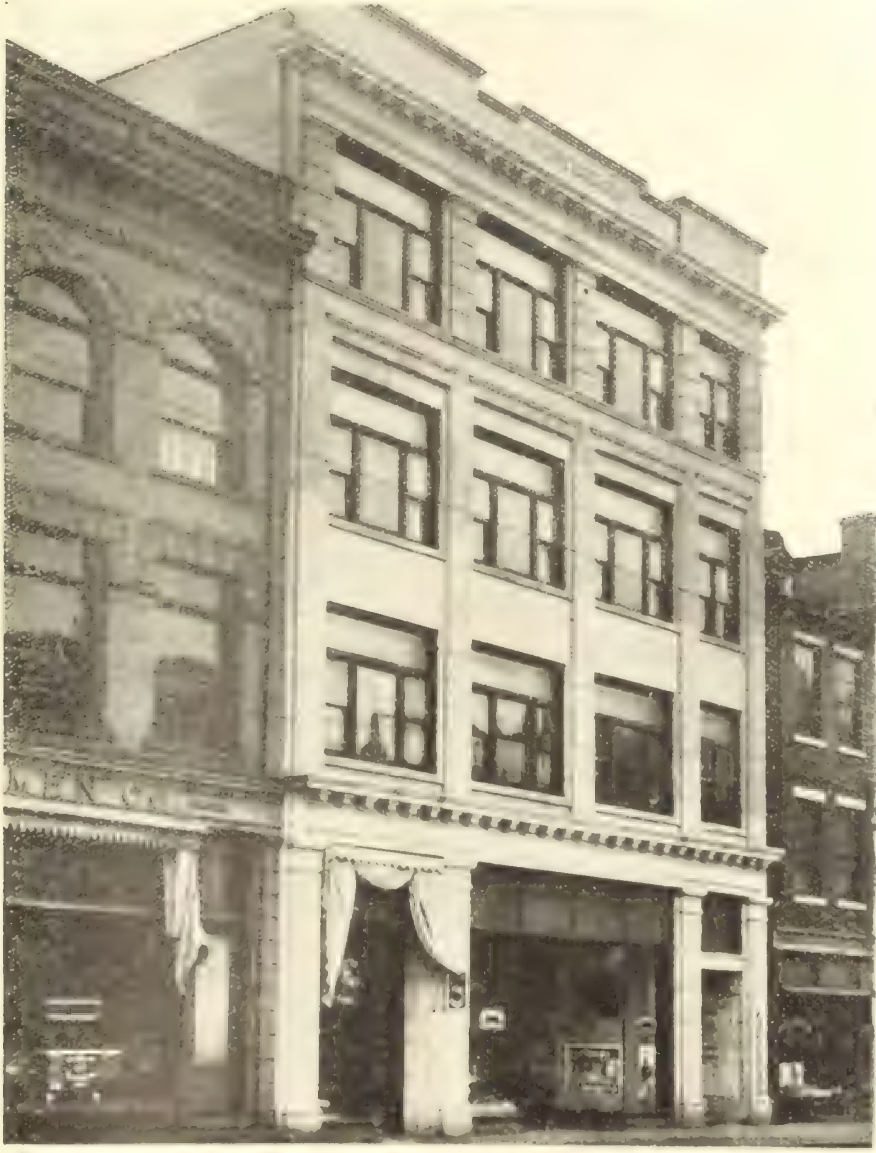

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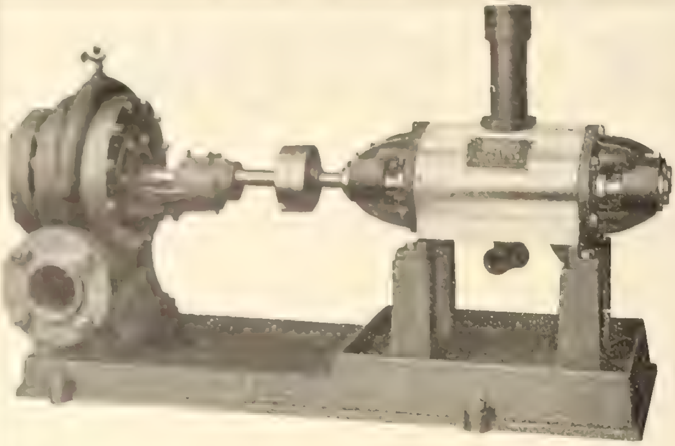

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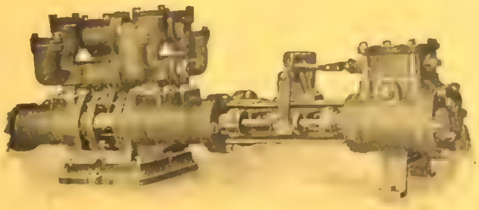

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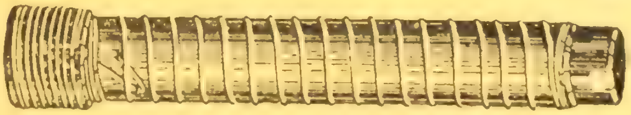

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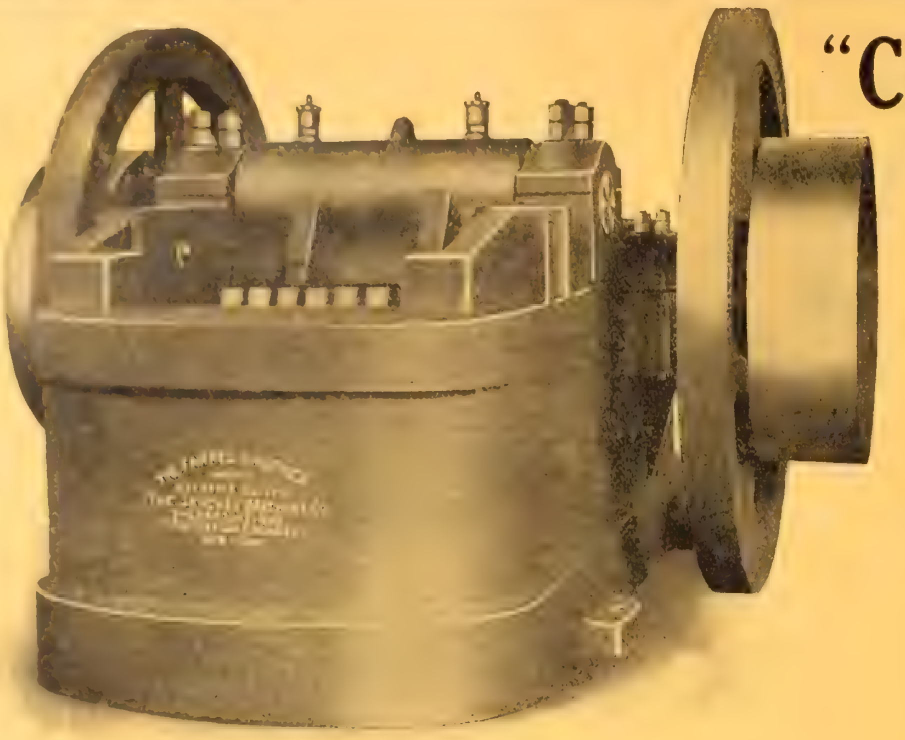

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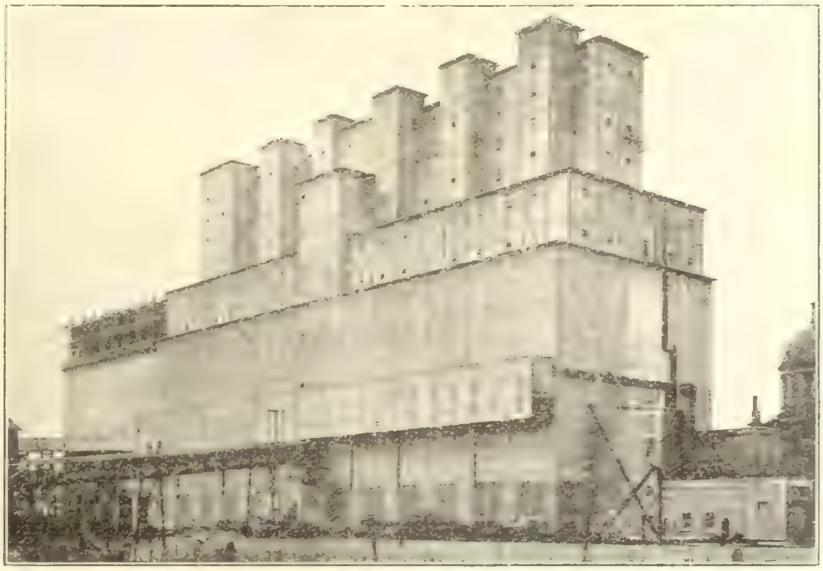

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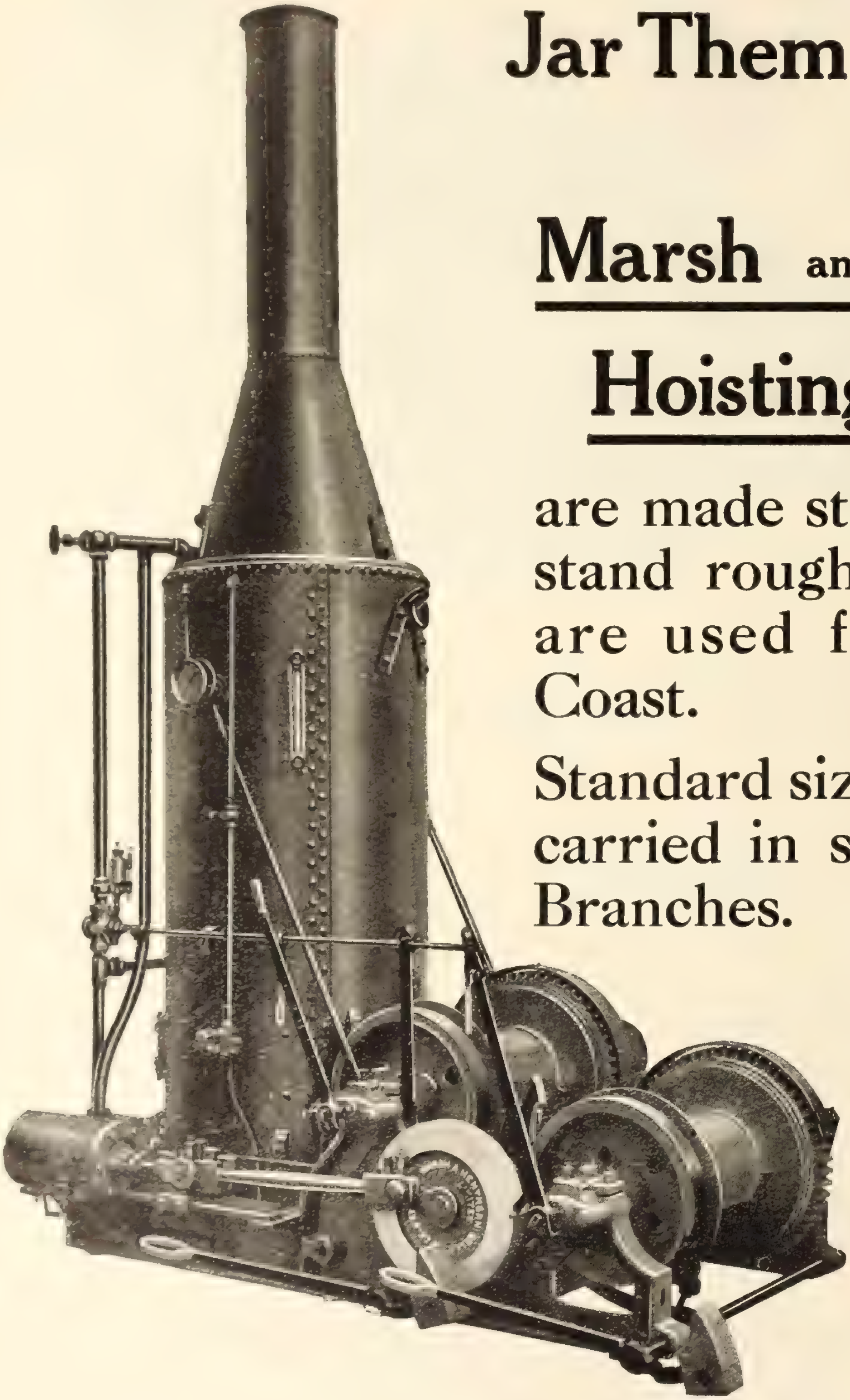

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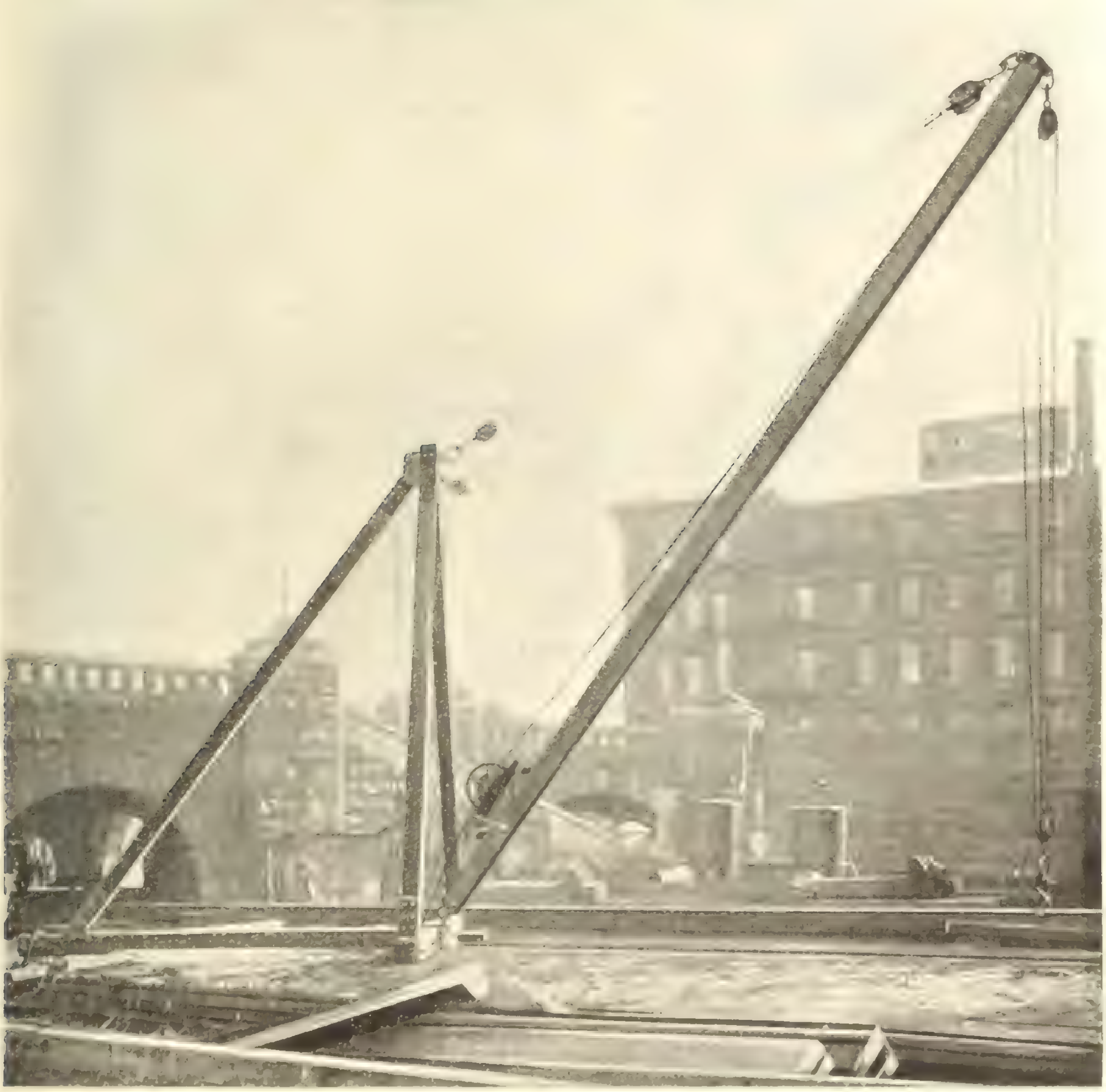

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- Toronto Plate Glass Imp't'g Co

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- Sheldons Limited
- Jenckes Machine Co.

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- Browning Engineering Co.
- Canadian Fairbanks-Morse Co.
- Canadian Ingersoll-Rand Co.
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- Inglis, John
- Jenckes Machine Co.
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- Lecky & Collis
- Marsh & Henthorn
- Mussens Limited
- Royce Limited
- Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
- Canadian Fairbanks-Morse Co.

Horse Stable Fittings
- Beatty Bros.

Hydrants
- Canada Iron Corporation
- Gartshore-Thomson Pipe Co.
- Kerr Engine Co.

(Continued on page 12)

Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.

Lumsden Building, Toronto
J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.
Don Valley Fireproofing, Bricks and Tile used throughout.

Traders Bank, Toronto
Carrere & Hastings and F. S. Baker, Associate Architects.
Don Valley Porous Terra Cotta Fireproofing and 2,000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

Royal Bank, Toronto
Eustace G. Bird associated with Carrere & Hastings, Architects. Norcross Bros., Contractors.
Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Bell Telephone Building
Adelaide Street, Toronto.
W. J. Carmichael, Architect. [illegible] Limited, Contractors.
Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

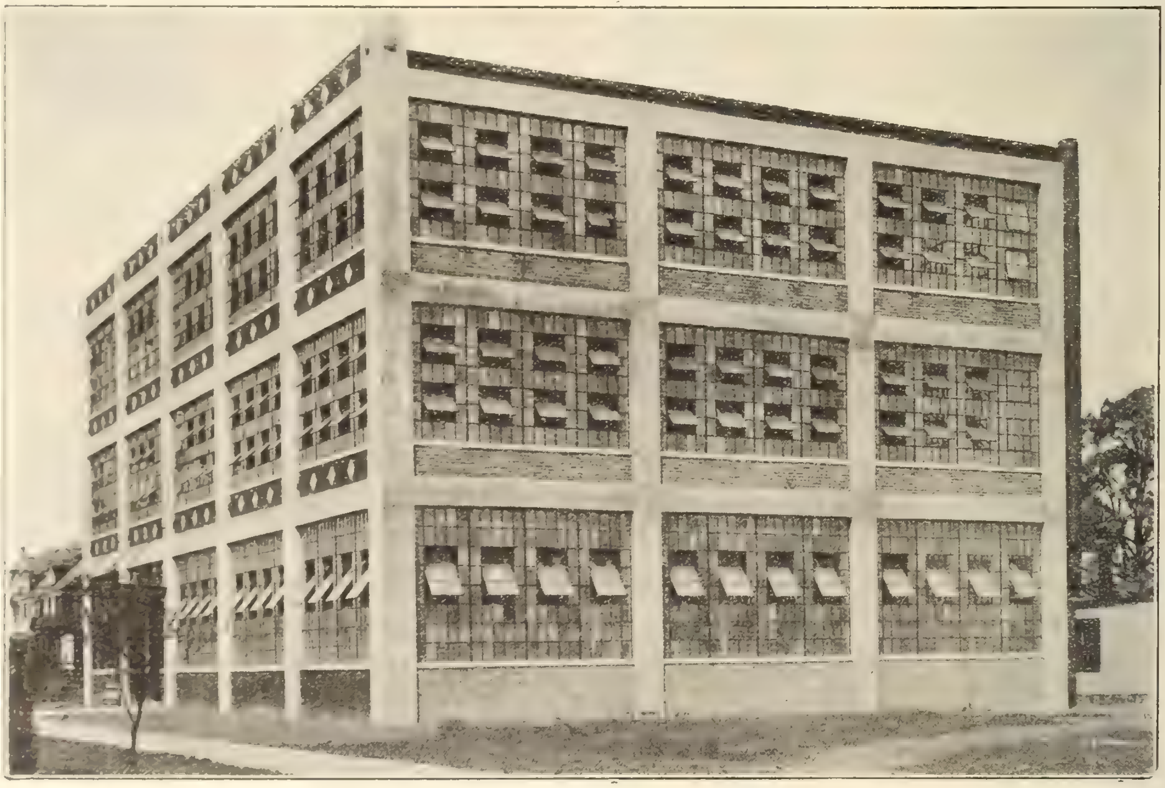
TORONTO - ONTARIO

LIGHT + VENTILATION = PROFITS

FENESTRA SOLID STEEL WINDOWS will provide your factory with an abundance of pure air; and light practically as good as that "out doors." Your employees will be able to do more and better work.

FENESTRA STEEL SASH not only increases production, but also reduces costs. Window upkeep expenses and artificial lighting bills are reduced almost to the vanishing point.

FENESTRA SASH is inexpensive compared with wooden sash, which is short lived and inflammable. It affords the minimum obstruction to light. It is attractive in appearance, strong and durable. Made to meet all conditions and sizes of window openings.

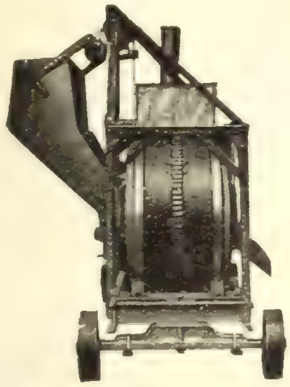


One of many buildings in Canada equipped throughout with "FENESTRA."

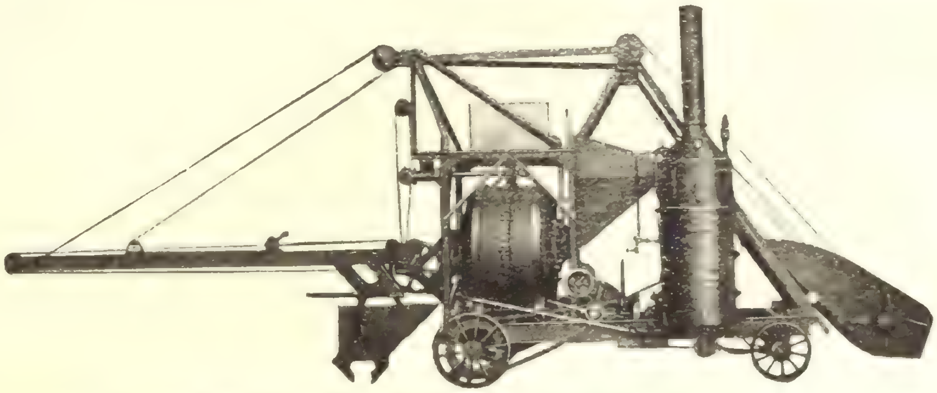
WRITE TO-DAY FOR CATALOG describing fully the merits of steel sash for all types of industrial buildings, large or small. FENESTRA has no equal for windows for foundries, power houses, factories, public buildings, machine shops, draughting rooms, railroad shops or any other buildings where the maximum light and ventilation are desired.

STEEL AND RADIATION, LIMITED

TORONTO, CANADA



London Standard Drum Batch Mixer



London Street Paving Mixer with Front Board and Delivery Boom

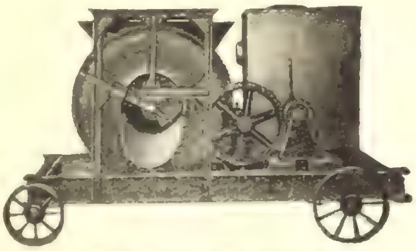
Before you Buy Machinery or Equipment of any kind

write to us for our 1913 CATALOGUE. It will save you TIME and MONEY. Do you know that we are the ONLY LARGE MANUFACTURERS who specialize on

Concrete Machinery and Contractors' Equipment

The following is a few of our lines

LONDON STANDARD DRUM BATCH MIXER in Five sizes any kind of Power or Equipment.
DRUM PAVING MIXER with Forward Loader and Rear Discharge.
DRUM PAVING MIXER with Side Loader and Rear Discharge.
AUTOMATIC BATCH MIXER Two sizes any kind of Power.
MORTAR MIXERS.
HAND POWER CONCRETE MIXERS.
TILE MOULDS.
CEMENT BLOCK MACHINES.
CEMENT BRICK MACHINES.
CEMENT TILE MACHINES.

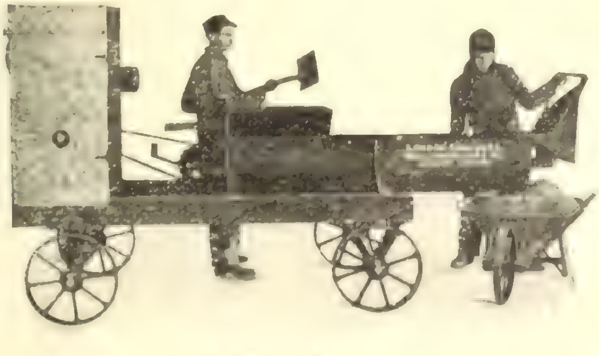


London Standard Drum Batch Mixer

SIDE WALK TILE MACHINES.
SILL STEP and **WINDOW CAP MOULDS.**

ORNAMENTAL MOULDS.
ROCK CRUSHER.
SCREEN and **ELEVATORS.**
MASON'S SAND SCREENING MACHINE.
GASOLINE ENGINES.
PUMPING OUTFIT.
GASOLINE HOISTS.
SIDEWALK FORMS.
MATERIAL ELEVATORS.
DRIERS both Portable and Stationary
FENCE POST MOULDS.
CONCRETE CARTS.
WHEELBARROWS.

And a complete line of Cement Working Tools.



London Mortar Mixer

London Automatic Batch Mixer No. 2

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

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WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, (106 Pleasant St.) G. B. Oland, Mgr.

AGENCIES:

VANCOUVER, B. C. Equipment Co.,
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng. & Supply Co
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

EVENTUALLY

—WHY NOT NOW?

You **must** have a **Good Mixer** some time—You can't go on putting up with a poor makeshift—You will realize some time that you **must** have a mixer that will do the best work, and when you realize that you will naturally turn to

The Famous
WETTLAUFER HEARTSHAPE MIXER

This is the mixer that will do **good work** for you **all the time** — the mixer that saves you time and money and increases the efficiency of your equipment.

Strong Construction

Automatic Operation

Low Working Cost

Rapid and Perfect Mixing

Increased Capacity

Minimum Repairs

Full particulars and catalogue on request.

Come and see this mixer working—Continuous demonstrations at

WETTLAUFER BROTHERS

TORONTO, ONTARIO

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MONTREAL OFFICE and WAREROOMS : **316 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave.**

For Your Next Shipment of Cement, Order

ROGERS
Portland Cement

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at
Kirkfield - Owen Sound - Hanover - Orangeville - St. Mary's

Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone—but cheaper.—A perfect imitation—Adaptable to all ornamentation or architectural decoration, both interior and exterior.

Quotations made for all Work—Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

28 King St. West **Toronto, Ontario**

Western Sales Manager
W. J. DINNEN & CO., Winnipeg, Man.

CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

Icemaking Machinery
  Linde British Refrigeration Co.

Insulating Compounds
  Canadian Mineral Rubber Co.
  Standard Underground Cable Co.
    of Canada, Limited

Interior Finish and Doors
  [illegible]
  Canadian Office & School Fur. Co.
  Oshawa Int. Fittings Co.
  Rhodes Curry & Co.

Kilns
  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Lime
  Jamieson Lime Co.
  Ontario Lime Association

Lime Kilns
  Improved Equipment Co.

Locomotives
  Canadian Boving Co.
  Montreal Locomotive Works
  Canada Foundry Co.

Marble
  Dominion Marble Co.
  Lautz Company
  Missisquoi Marble Co.

Metal Lath
  Greening Wire Co., B.
  Metallic Roofing Co.
  Noble, C. W.
  Steel & Radiation Ltd.

Metal Forms
  Hotchkiss Lock Metal Form Co.

Meters, Electrical
  Ferranti Electrical Mfg. Co.

Meters, Water
  Hopkins & Co., F. H.
  McDougall Caledonian Iron Wks.
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  Elaterite Paint Co.
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Paving and Paving Materials
  Dominion Creosoting Company
  Metropolitan Paving Brick Co.
  Ontario Asphalt Block Co.
  Paterson Mfg. Co.

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  Canadian Pipe Co.
  Dominion Concrete Co.
  Gartshore-Thomson Pipe Co.
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  National Iron Works
  National Pipe & Foundry Co.
  Pacific Coast Pipe Co.
  Pedlar People Limited.
  Piggott & Co., Thos.

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  Canadian Ingersoll-Rand Co.
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  Vulcan Iron Works

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  Alabastine Co.
  Albert Mfg. Co.
  Britnell & Co.
  Crown Gypsum Company

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  Canadian Ingersoll-Rand Co.

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  Standard Ideal Co.

Plumbers and Steam Fitters Brass Goods
  Mitchell Company, Robt.

Pneumatic Machinery
  Canadian Ingersoll-Rand Co.

Portable Saws
  Canadian Fairbanks-Morse Co.

Portable Track
  Bechtels Limited

Power Engines
  Inglis Company, John

Pumps and Pumping Machinery
  Bates & Edmonds
  Beatty & Sons, M.
  Canada Foundry Co.
  Canadian Boving Co.
  Canadian Buffalo Forge Co.
  Canadian Fairbanks-Morse Co.
  Canadian Ingersoll-Rand Co.
  Cook, A. D.
  Escher Wyss & Co.
  General Supply Co.
  Hamilton Mfg. Co., Wm.
  Hopkins & Co., F. H.
  Inglis & Co., John
  McDougall Caledonian Iron Wks.
  Smart-Turner Machine Co.
  Waterous Engine Works Co.
  Mussens Limited
  Ontario Wind Eng. & Pump Co.

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  Canadian Ingersoll-Rand Co.
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  Ambursen Hydraulic Cons. Co.
  Canada Steel Co., Ltd.
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  Steel & Radiation Ltd.
  Trussed Concrete Steel Co.
  Turner, C. A. P.

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  Greening Wire Co., B.

Road Asphalt
  Canadian Mineral Rubber Co.

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  Morrison & Co., T. A.
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  Waterous Engine Works Co.
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  Asbestos Mfg. Co.
  Can. H. W. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Canadian Supply Company
  Metallic Roofing Co.
  Noble, Clarence W.
  Paterson Mfg. Co.

(Continued on page 14)

ACCURATE METERS

Glass Case Top Connections

Ferranti

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Steel Case—Top or Bottom Connections

The Ferranti Electrical Co. of Canada, Limited

TORONTO, 90 Sherbourne St. WINNIPEG, 56 Albert St.

PORTLAND

CEMENT

CRUSHED

STONE

The Rogers Supply Co.
28 King St. West
Toronto
Telepone Main 4155

G.T.R. and C.P.R. Delivery
6 Supply Yards

Prompt Service

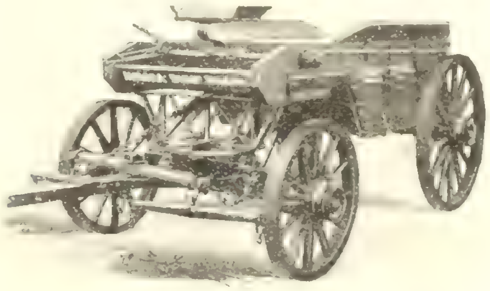
Busy Contractors Use
New Model Aurora Dump Wagons

because they want wagons that will haul the most material in the least time and that are on the job every working hour.

A novel feature has been added to this wagon which places it beyond comparison with any other on the market, namely, **a steel channel filled with wood for the main side board,** giving unusual strength. This is the portion of the wagon that stands the heaviest strain. With this reinforced side board, breakage is practically impossible. It is short coupled and built low. Light in weight. **Write today.**

Western Wheeled Scraper Co.
Aurora, Illinois
Earth and Stone Handling Machinery

E. P. Jamison & Company, Ltd., Vancouver
Agents for British Columbia



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS

1903	$ 0.00	1908	$ 93.26
1904	3.30	1909	200.46
1905	9.35	1910	14.07
1906	37.33	1911	2.29
1907	16.11		

Total $376.17 or 5¾c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.
Hagersville, Ont. **Limited**

CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

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Sand and Gravel
Sand and Supplies Ltd.
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Canada Wire & Iron Goods Co.
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Canada Iron Corporation
Dominion Sewer Pipe Co.
Gartshore Thomson Pipe Co.
National Iron Works
Ontario Sewer Pipe Co.
Smyth & Ryan
Standard Clay Products Ltd.

Sewer Trenching
Lecky & Collis

Sound Deadening
Cabot Inc., Samuel

Shovels (Steam)
Browning Engineering Co.
Beatty & Sons, M.
Canada Foundry Co., F. H.
Hopkins & Co., F. H.
Montreal Locomotive Works
Mussens Limited
Thew Automatic Shovel Co.
Willis Shaw Mach. Co.

Shovels
Lundy Shovel & Tool Co.

Smoke Stacks
Des Moines Bridge Co.
Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
Cabot, Inc., Samuel
Pinchin, Johnson & Co.

Steam Apparatus
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F

Steam Turbines
McDougall Caledonian Iron Wks.

Steel
Canada Steel Co., Ltd.
Dominion Steel Castings Co.
Lecky & Collis
Provincial Steel Co.

Steel Bars
Canada Steel Co., Ltd.
Steel Co. of Canada.
Steel & Radiation, Ltd.

Stone
Britnell & Co.
Brodie, Jas.
Consolidated Stone Co.
Contractors' Supply Co.
Corinthian Stone Co.
Crushed Stone, Limited
Hagerville Contracting Co
Mahan & Company
McMillan & Son, W.
Morrison & Co., T. A.
Myers, Oakley
Queenstown Quarry Co.
Roman Stone Co.
Sackville Freestone Co.
Sand & Supplies
Smyth & Ryan

Stone Saws
Anderson, Geo.

Structural Iron and Steel
Canada Steel Co.
DesMoines Bridge Co.
Dominion Bridge Co.
Dominion Steel Castings Co.
Hamilton Bridge Works Co.
Mackinnon Holmes & Co.
McNeil & Co., W. P.
Phoenix Bridge & Iron Works
Provincial Steel Company
Reid & Brown
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Lecky & Collis

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Hamilton Mfg. Co., Wm.
Inglis, John
Jenckes Machine Co.
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McDougall Caledonian Iron Wks
Ontario Wind Eng. & Pump Co.
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Tents
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Hunt & Co., Robt. W.

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Gartshore-Thomson Pipe Co.
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Ventilating & Heating Apparatus
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Cabot Inc., Samuel
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Canadian Mineral Rubber Co.
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Pinchin, Johnson & Co.

Water Softeners and Filters
American Water Softener

Water Turbines
Canadian Boving Co.
Escher Wyss & Co.
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McDougall Caledonian Iron Wks.

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Standard Underground Cable Co. of Canada, Limited

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Wire Guards and Screens
Canada Wire & Iron Goods Co.
Greening Wire Co., B.

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Canada Wire & Cable Co.
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Smith, Thos. & Wm.
Steel Co. of Canada

Wood Turnings
Automatic Wood Box & Turning Company

These High-Grade Asphalts Insure High-Class Results

For 17 years "Pioneer" Asphalts have been specified by Engineers for important projects in which the highest efficiency and the greatest durability were of first consideration. The record of these materials is a record of success.

"Pioneer" Road Asphalt—For durable, waterproof, auto-proof macadam roads.

"Pioneer" Paving Cement—For reliable, economical Sheet Asphalt Pavements.

"Pioneer" Filler Asphalt—For filling the interstices in brick and block pavements. Sanitary—and always stays in place.

"Pioneer" Road Surface Asphalt—For building up macadam roads. Lays the dust—only one application a year necessary.

"Pioneer" Asphalt Mastic Floors—For manufacturing plants, breweries, canning establishments, ice plants, warehouses, etc.

"Pioneer" Asphalts have a Gilsonite base—99.5 per cent pure bitumen—and in actual service have established their supremacy. Specifications and further particulars on request.

In addition to the above we invite attention to "Pioneer" Mineral Rubber Pipe Coating, "Pioneer" Waterproofing Asphalt, "Pioneer" Sewer Joint Asphalt, "Sterling" Waterproofing Products, Structural Paints, Roof Paints, etc., etc.

THE CANADIAN MINERAL RUBBER CO., Ltd.

Montreal Winnipeg Victoria London, Eng.

Barrett Specification Roofs

Economical on Small Roofs, Too

We have been advertising Barrett Specification Roofs with illustrations of enormous buildings and manufacturing plants where the roof areas run as high as a million square feet. In such cases, scientific estimates of the unit cost are made, that is, the cost per square foot per year of service. Such calculations simply compel the adoption of this type of roofing.

The owner of an ordinary building, like that illustrated above, with a roof area of a few thousand square feet, also saves money by adopting Barret Specification Roofs.

There is very little difference in unit cost between a big roof and a little one of this type, and the slight difference is completely submerged in the big gap between the cost of this and the next most economical roofing—i.e., Barret Specification Roofs are so much more economical per year of service than any other kind that a simple examination of the figures would compel their use if they cost 50 per cent. more than they do.

As manufacturers of coal tar pitch and felt, we are interested in the success of this type of roofing. We, therefore, have made the Barrett Specification standard in the trade in order to protect owners and architects against poor workmanship and materials and insure maximum service at minimum cost.

Copy of The Barrett Specification will be sent free on request.

Special Note

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If an abbreviated form is desired, however, the following is suggested:

ROOFING—Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified and subject to the inspection requirement.

THE PATERSON MFG. CO., Limited

Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

ALPHABETICAL LIST OF ADVERTISERS

[illegible]am Cement Tool Company 29
[illegible]
[illegible] .. 108
[illegible]
[illegible] Works .. 89
[illegible] .. 92
[illegible] .. 2
[illegible] .. 25
[illegible]
[illegible] .. 22
[illegible]
[illegible] .. 104
[illegible] .. 87
[illegible] .. 89
[illegible] .. 92

Baker Company, R. D. 35
[illegible] .. 29
[illegible]
Beath & Son, Limited, W. D. 30
[illegible] .. 110
[illegible]
[illegible]
Bennett, Robert .. ..
[illegible] .. 21
[illegible] .. 87
Bowman & Connor 104
Britnell & Company, Limited 98
Browning Engineering Company 25
Bremner, Limited, Alex. 103
Brown Hoisting Machinery Company 111
Brown Machine Company 98
Brodie & Company, James .. ..
Buff & Buff Manufacturing Company .. ..

Cabot, Incorporated, Samuel .. ..
[illegible] .. 104
Canada Cement Company 3
Canada Foundry Company, Limited 34
Canada Iron Corporation Limited 103
Canada Lifting Jack Company 95
Canada Steel Company 25
Canada Wire & Cable Company 33
Canada Wire & Iron Goods Company 83
Canadian Boving Company 26
Canadian Bridge Company 100
Canadian Buffalo Forge Company 114
Canadian Fairbanks-Morse Co., Ltd. 115
Canadian H. W. Johns-Manville Co. 19
Canadian Kellogg Company .. ..
Canadian Mineral Rubber Company 14
Canadian Office School Furniture Co. 84
Canadian Pipe Company, Limited 34
Canadian Ingersoll-Rand Company 1
Canadian Supply Company 39
Ceresit Waterproofing Company 91
Chain Belt Company 113
Chipman & Power 104
Clapham & Sons, John .. ..
Commercial, The .. ..
Conduits Company Limited 103
Consolidated Stone Company .. ..
Consolidated Plate Glass Company .. .. ..
Contractors' Supply Company, Ltd. 98
[illegible]
Corinthian Stone Company .. ..
Crown Gypsum Company .. ..
Crushed Stone Limited 85

Dake Engine Company 103
Dennis Wire & Iron Works Company 83
DesMoines Bridge & Iron Company 101
[illegible]
Dominion Bridge Company 100
Dominion Concrete Company 82
Dominion Creosoting Company 86
Dominion Ornamental Iron Company .. .. ..
Dominion Marble Company 19
Dominion Sewer Pipe Company 18
Dominion Steel Castings Company 24
Dominion Wood Pipe Company 92
Don Valley Brick Works 7
Doty Marine Engine & Boiler Co. 23
[illegible] .. 46

Elaterite Paint Company 33
Engineering Works of Canada .. ..
Erie Machine Shops 106
Escher Wyss 91

Farmer, John T. 104
Ferguson, H. S. 104
Ferranti Electrical Company 12
Foundation Company 105
Fuce & Smith 104

Galt Engineering Company, John 104
Galt Stove & Furniture Company 82
Gardner & Saxby 104
Gartshore, John J. 104
Gartshore-Thompson Pipe & Foundry Co. .. 102
Gaudry & Company, L. H. 107
Gibbs & Canning 113
Goheen Manufacturing Company 22
Goodyear Tire & Rubber Co. of Canada, Ltd. 37
Greening Wire Company, Limited, B. .. ..
Gurley, W. & L. 93

Hagersville Contracting Company 13
Hancock, Jr., H. Syd. 104
Hamilton Art Glass Co., Ltd. .. ..
Hamilton Bridge Company 26
Hamilton Mfg. Company, Wm. 19
Hamilton Pressed Brick Company 109
Harvey, J. 106
Heinicke Company, H. R. 18
Hepburn, John T. 31
Hobbs Manufacturing Company 79
Hopkins & Company, F. H. 116
Hotchkiss Lock Metal Form Company 85
Hunt & Company, Robert W. 104

Improved Equipment Company 35
Imperial Wire & Cable Company 115
Inglis Company, John 21
International Marine Signal Co. 39-92

Jamieson Lime Company 96
Jenckes Machine Company 2
Jennings & Ross 93
Jones & Glassco 38

Kennedy, James C. 104
Kerr Engine Company, Limited .. ..
Koehring Machine Company 88

Laurentian Granite Company 104
Laurie & Lamb 90
Lautz Company .. ..
Lea, R. S. 104
Lecky & Collis 17
Leonard & Sons, E. 85
Linde British Refrigeration Company .. ..
London Concrete Machinery Company 9
Lundy Shovel & Tool Company .. ..
Luxfer Prism Company .. ..

MacLean Daily Reports 107
Mahan & Company 95
Mannesmann Tube Company .. ..
Marsh & Henthorn, Limited 82
McDougall Caledonian Iron Works Co., John 79
McDowall, R. 104
McKinnon Holmes & Company 90
McMillan & Sons, W. 95
McNeil & Company, William P. 102
Meadows, George B. 39
Metal Shingle & Siding Company 99
Metallic Roofing Company 83
Miller & Company, Geo. M. .. ..
Missisquoi Marble Co., Ltd. 92
Mitchell Company, Limited, Robert 100
Montreal Locomotive Works Limited 85
Montreal Real Estate Show 99
Morrison & Company 106
Mussens Limited 4
Myers, Oakley 85

Napanee Iron Works 17
National Bridge Company of Canada 101
National Iron Works Limited 103
National Pipe & Foundry Company 102
Neptune Meter Company 101
Nelsonville Brick Company 99
Noble, Clarence W. 84
Northwestern Terra Cotta Company 94
Nova Scotia Clay Works 94

Ontario Asphalt Block Co., Ltd. 89
Ontario Sewer Pipe Company 18
Ontario Wind Engine & Pump Co. 85
Ormsby Limited, A. B. 20
Oshkosh Manufacturing Company 33
Owen Sound Iron Works .. ..

Pacific Coast Pipe Company 1
Paterson Manufacturing Company 15-81
Pedlar People 97
Phoenix Bridge Company 94
Piggott & Company, Thomas .. .. ..
Pinchin Johnson & Company 114
Power & Son .. ..
Provincial Steel Company 24

Queenstown Quarry Company 103

Reid & Brown 104
Rhodes Curry Company, Limited 87
Richardson, J. E. 25
Rogers, Limited, Alfred 11
Rogers Supply Company 13
Roman Stone Company 28
Royce Limited 111

Sackville Freestone Company, Limited 84
Sand & Supplies Limited 102
Sarnia Bridge Company, Limited 101
Sheldons Limited 20
Sheppard, James 96
Silcox, A. B. 90
Slack & Company, T. 106
Smart-Turner Machine Company 1
Smith Limited, Thos. & Wm. 112
Smyth & Ryan 94
Standard Clay Products Limited 32
Standard Ideal Company 40
Standard Steel Construction Co. 101
Standard Underground Cable Co. of Canada 29
Stanley Company, W. F. .. ..
Star Expansion Bolt Company .. ..
Steel Company of Canada 24
Steel & Radiation 8
Stinson-Reeb Builders' Supply Co. .. .. ..
Structural Steel Company 100
Sturtevant Co. of Canada, Ltd., B. F. 113

Taylor, J. & J. .. ..
Thew-Automatic Shovel Company 23
Tiffin Wagon Company 88
Toledo Wheelbarrow Company .. ..
Toronto Plate Glass Importing Co. 1-94
Toronto Iron Works 89
Troy Wagon Company 36
Trussed Concrete Steel Company 98
Tuec Company .. ..
Turner, C. A. P. .. ..

United States Steel Products Co. 27
United Typewriter 35
Urschel-Bates Valve Bag Company 95

Waterous Engine Works Company 108
Weeks, Arthur L. 104
Welch & Company, H. J. 104
Wells & Gray 80
Western Canada Contractor 98
Western Wheeled Scraper Company 13
Wettlaufer Bros. 10
Woodstock Wind Motor Company 32
Wood and Service 104
Wooliscroft & Son, G. 113

York Sand & Gravel Company 98

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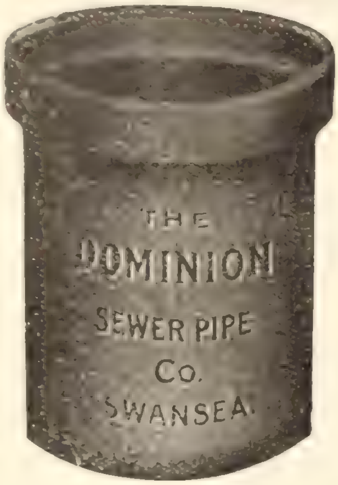

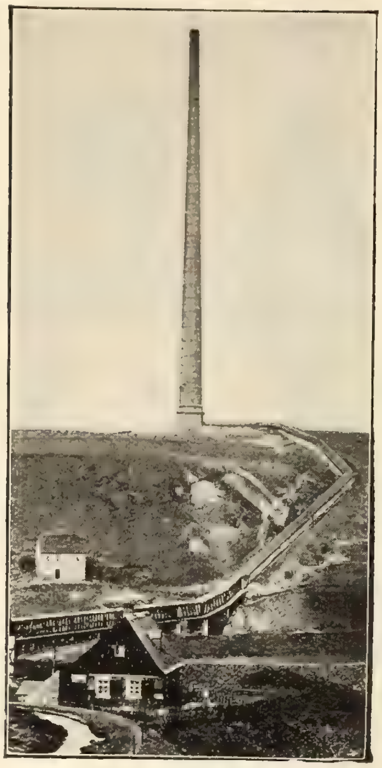

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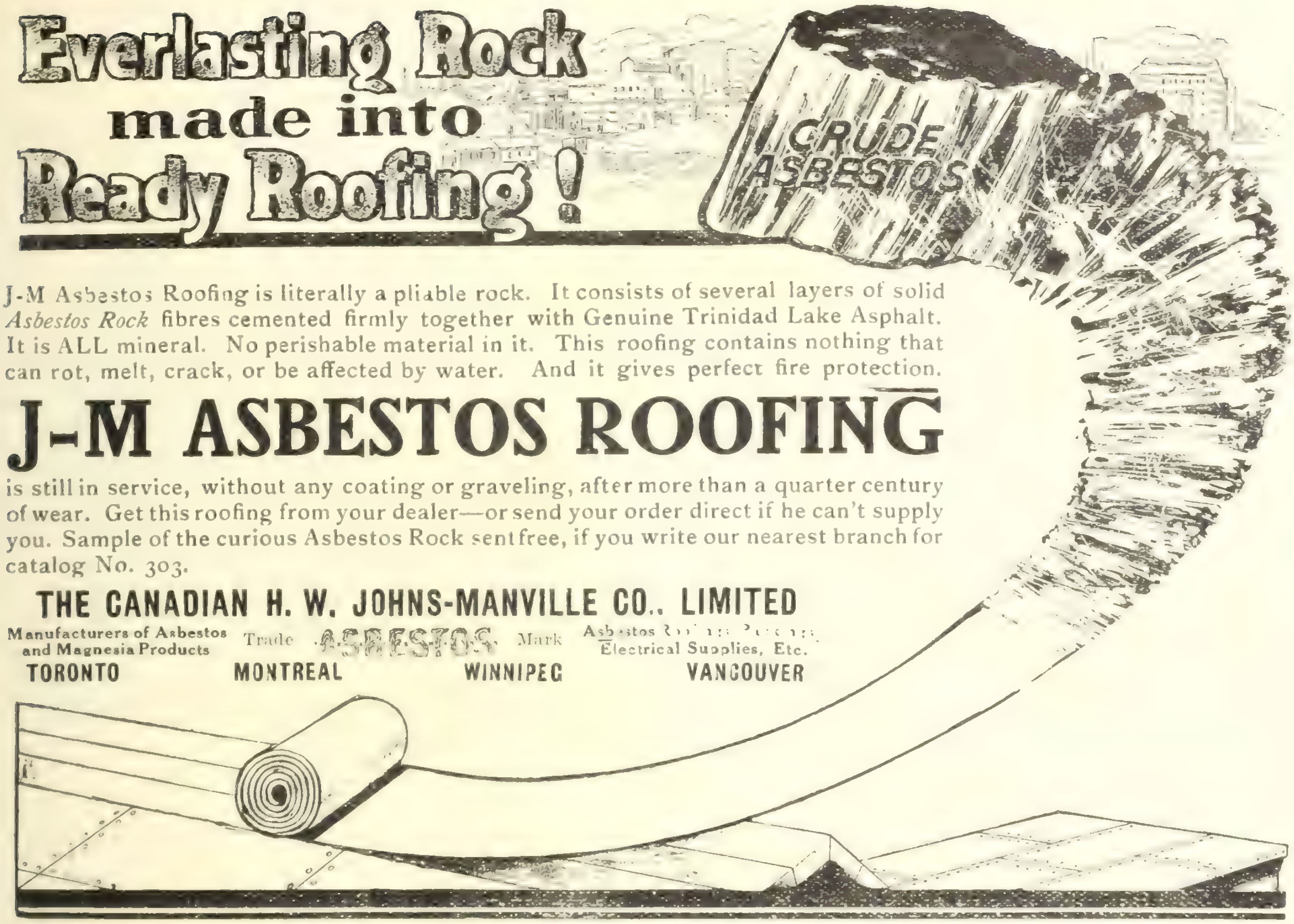

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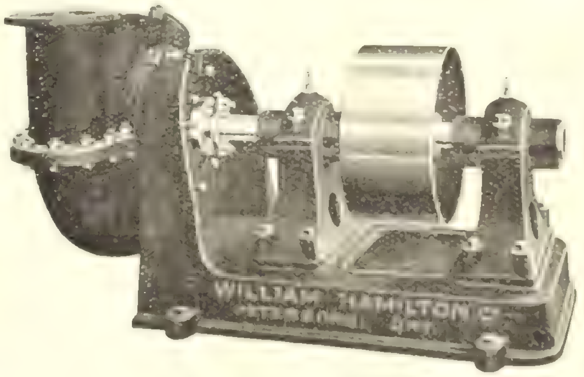

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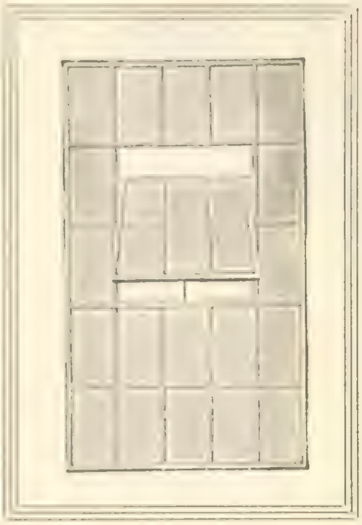

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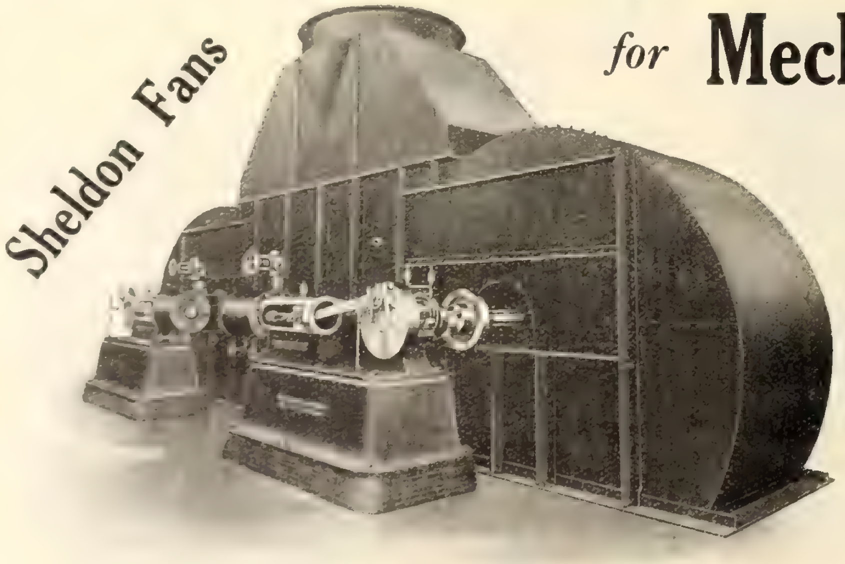

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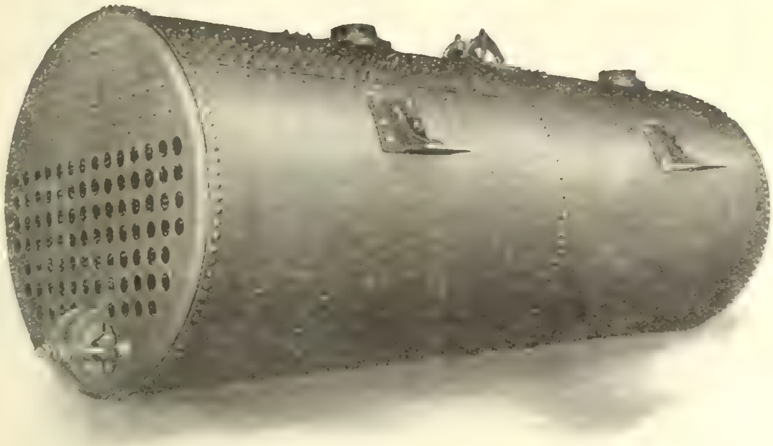

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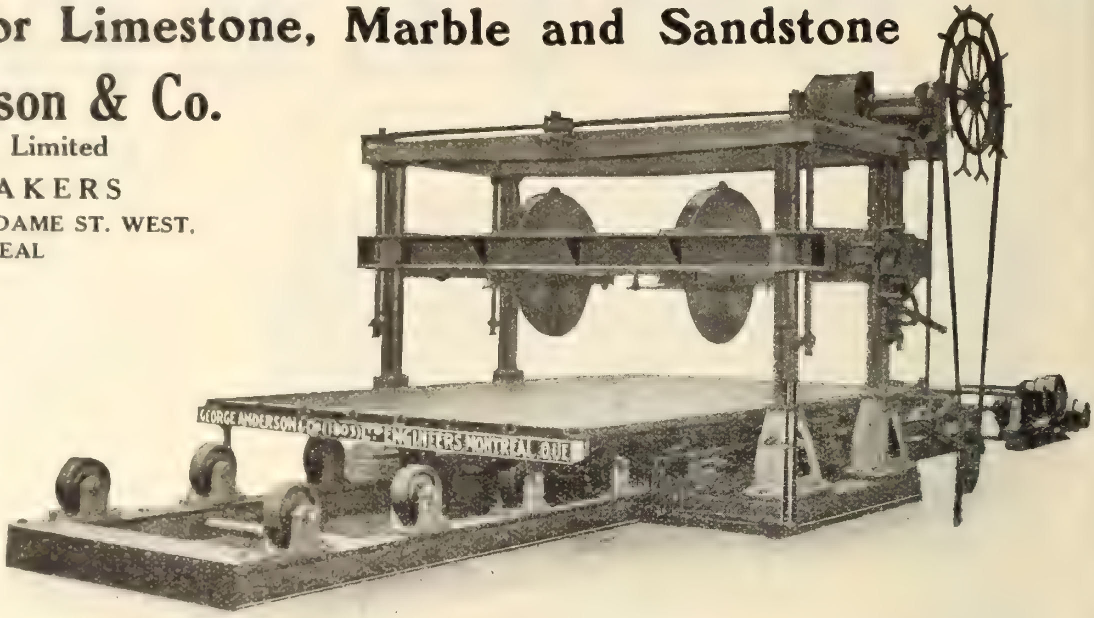

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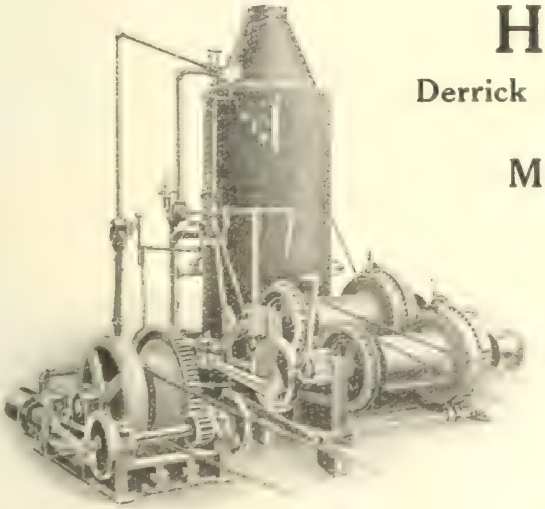

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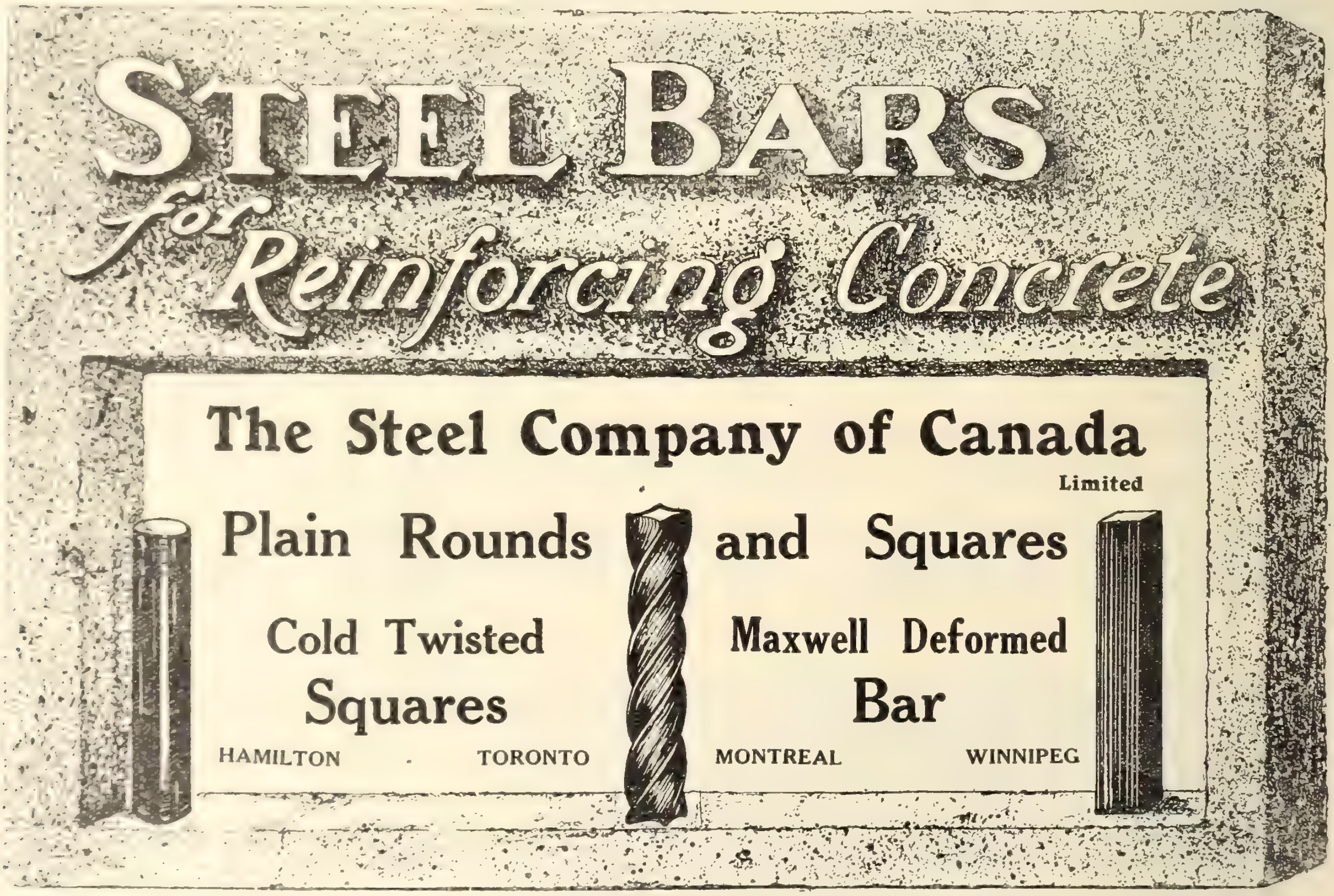

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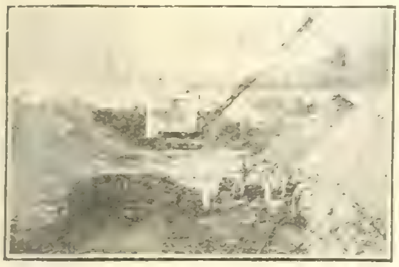

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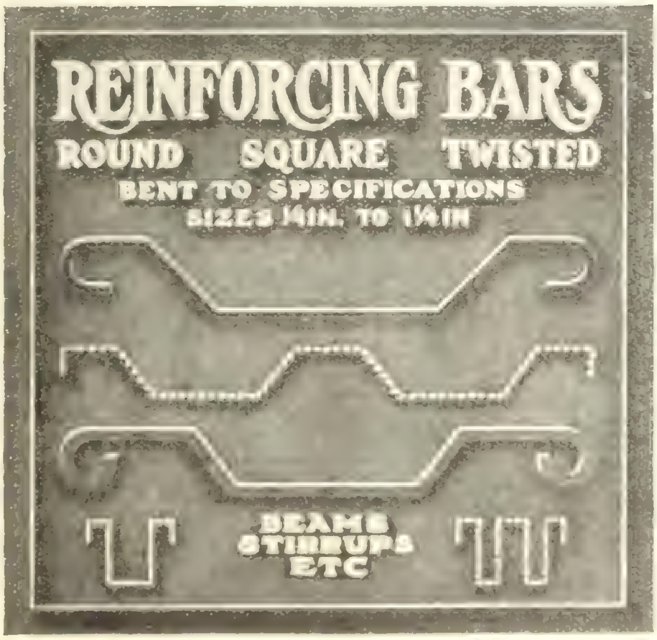

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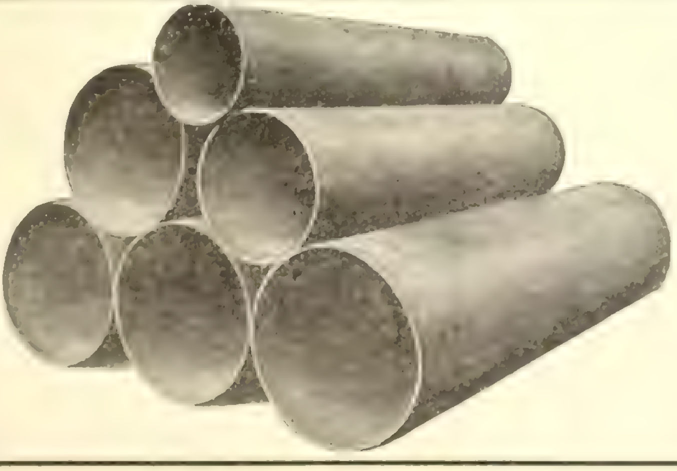

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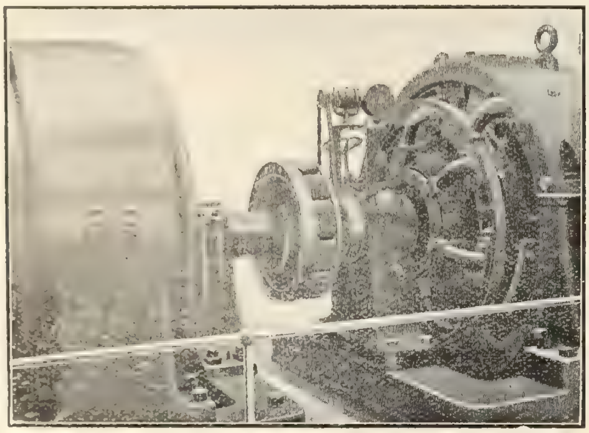

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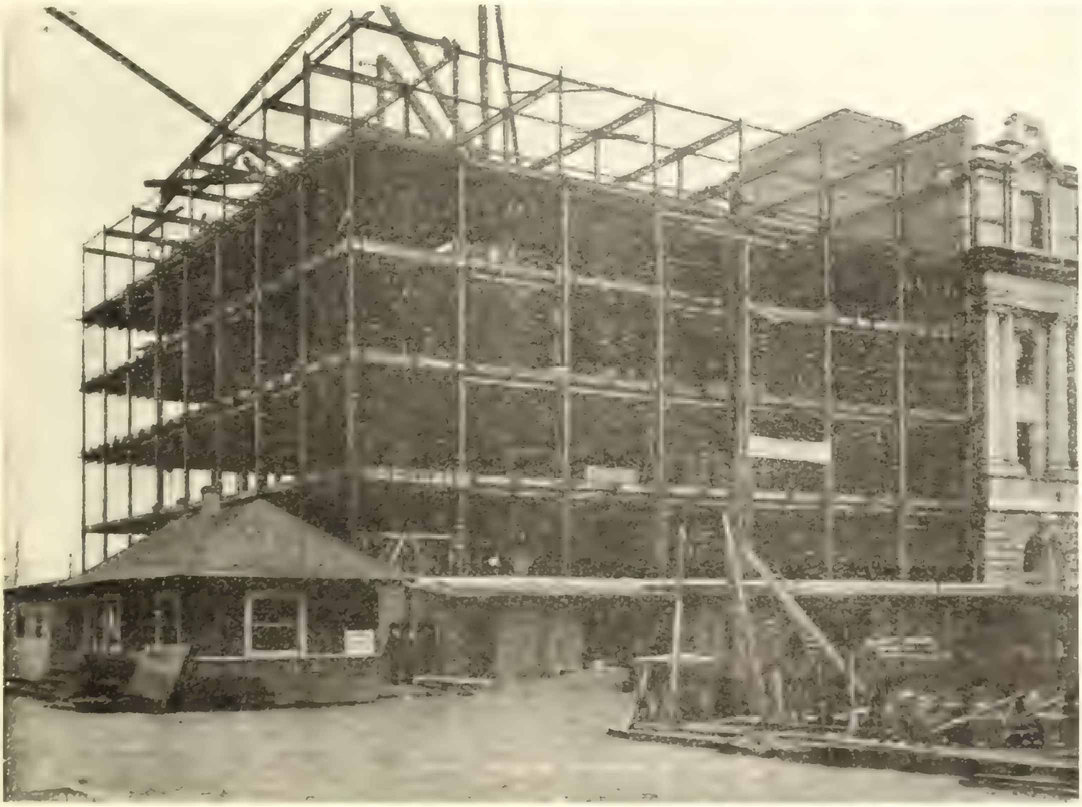

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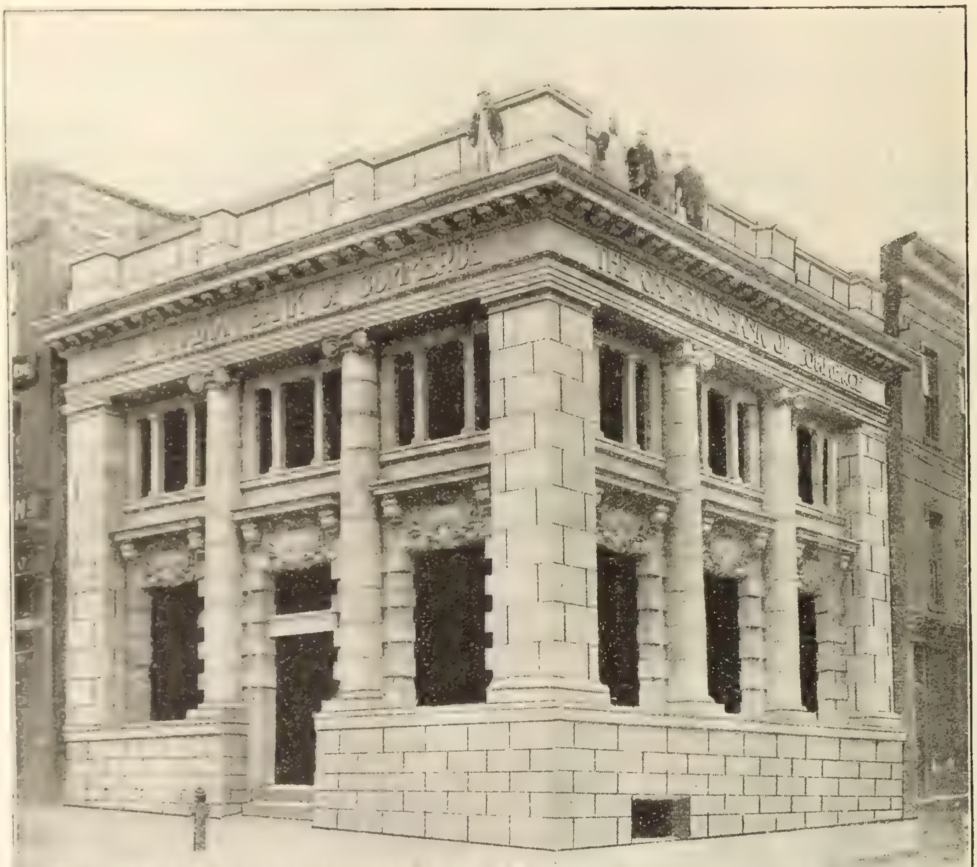

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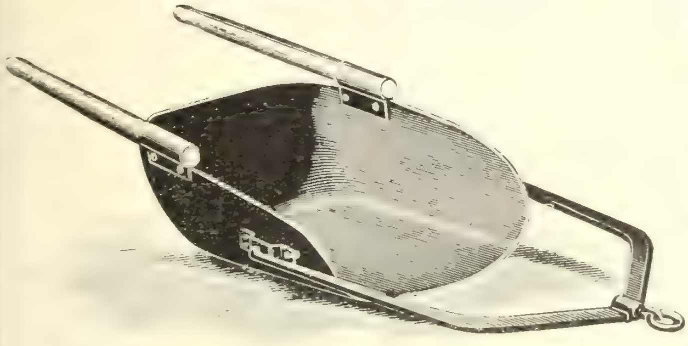

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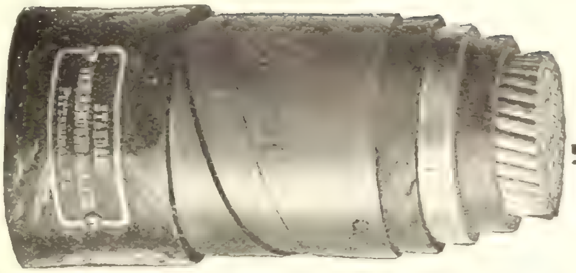

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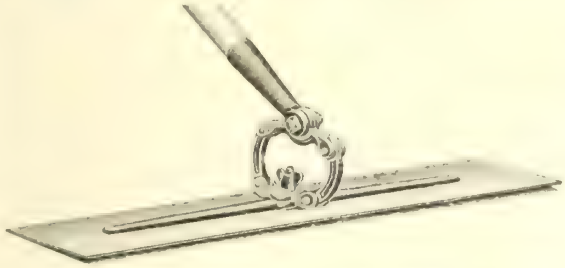

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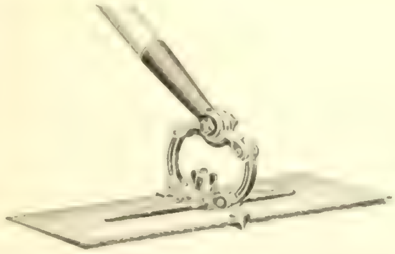

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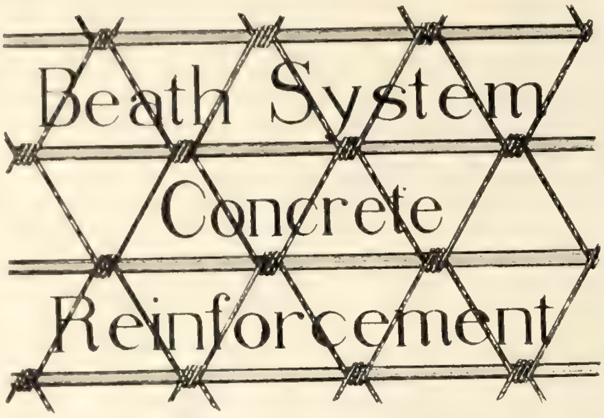

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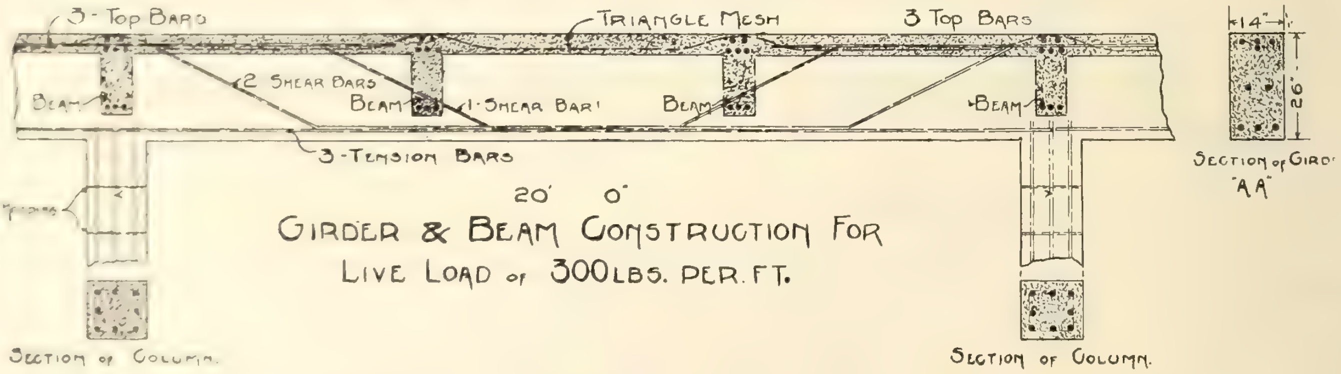

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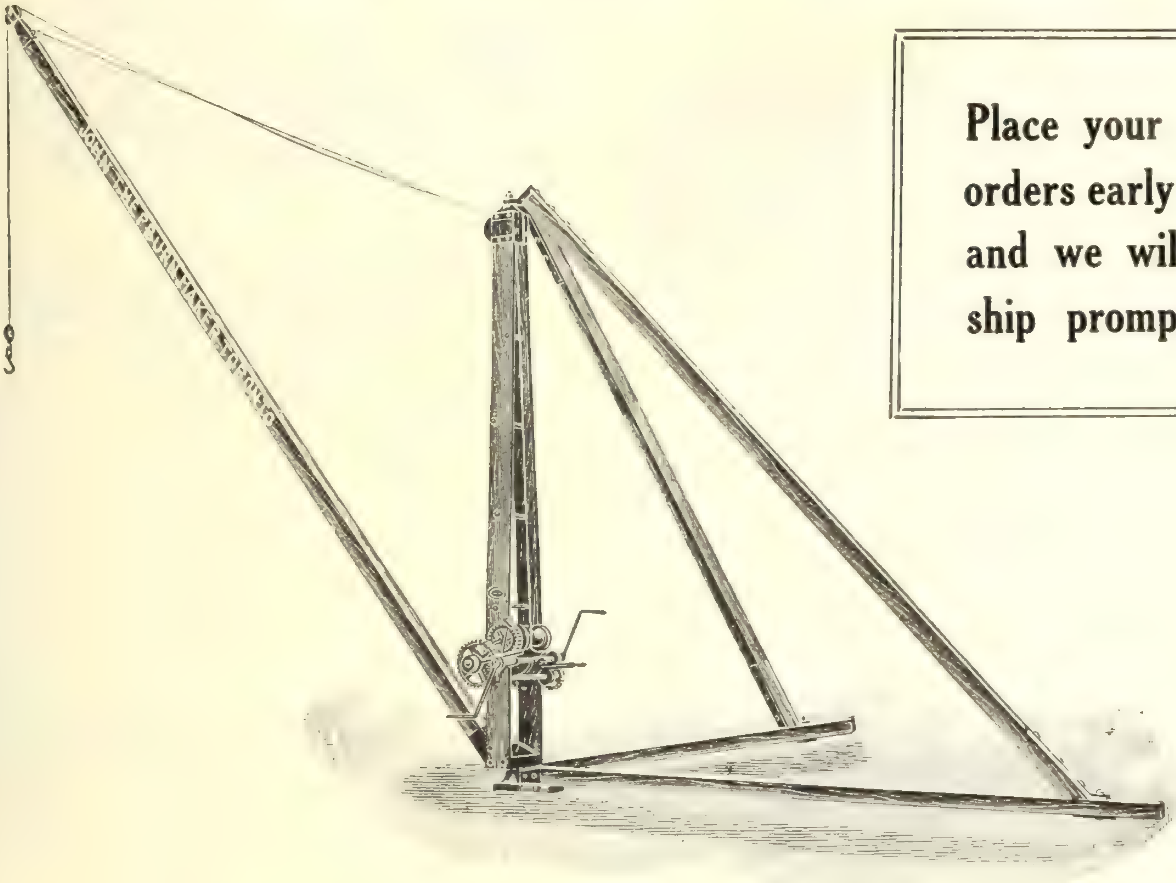
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Made in standard sizes—one-half ton upwards. Interchangeable parts kept in stock for prompt shipment. Operated by hand or power. Fitted with single and double-purchase gears, band brake, and high-grade wire heaving rope. Interchangeable parts always in stock.

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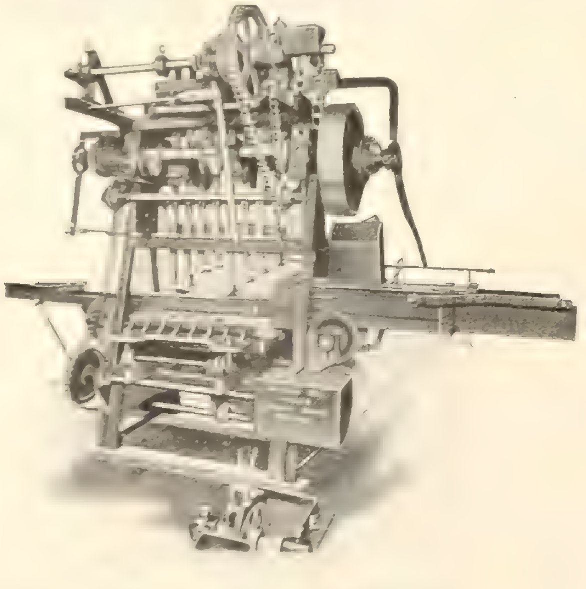
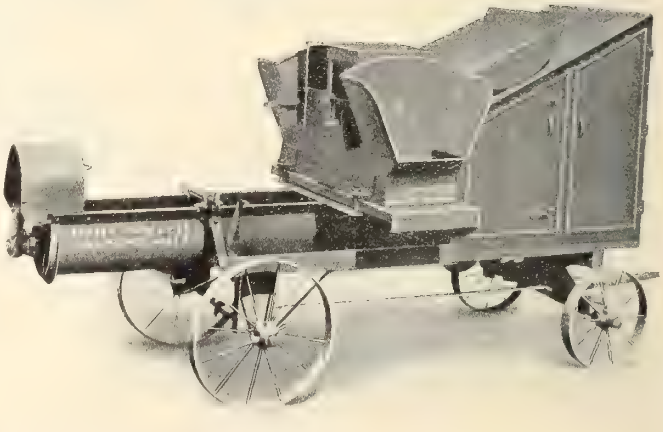


Besser Power Cement Brick Machine



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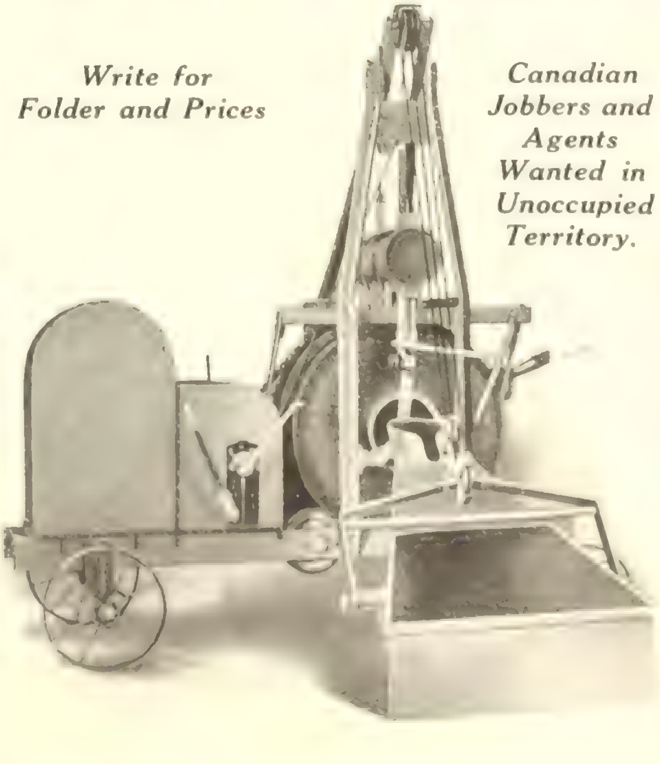

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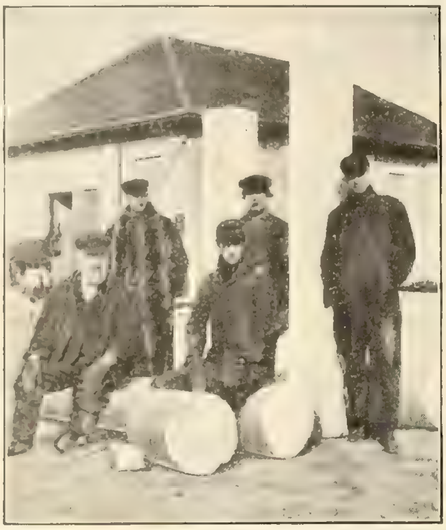
- Pile Hammers



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The 16 in. hard limestone cores shown above were taken out by one of our Type "C" McKiernan-Terry core drills, operated by the Corporation of Winnipeg.
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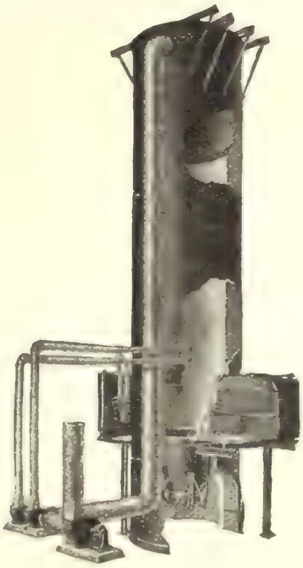

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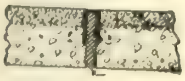
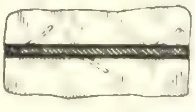

Cross Section of Pavement Showing Expansion Joint.

Baker Armored Concrete Pavements


Longitudinal Section Showing Joint.

These concrete pavements have been in use so long that they have made an unrivaled record for service and efficiency. The shear members tie each plate securely to the end of the pavement slab. The expansion joint space between the protected edges of adjacent slabs is filled with felt, asphalt or other joint filler.

Protect the expansion joints from the constant friction and abrasion of traffic and you have protected the most vulnerable part of your pavement. **The wear is at the joints,** which in time break down and holes are formed. Baker Plates armor the slab ends and are a part of the pavement. The contracting slab takes the plate with it—the edge is always protected against wear. Baker Plates may be used in any concrete pavement.

Engineers, highway officials and paving contractors are invited to write for our free book of specifications for concrete pavements. Prices of Plates furnished upon application.

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Think of it! **A nickel per ton per mile!**

Prinz & Carlson formerly used teams. The TROY outfit is saving them exactly 84 per cent. That means that their hauling costs them less than one-sixth (1/6) what it did with horses.

Now figure out your own record, please. How much is it costing **you?** No matter what you haul or where, tell us what it costs you. We will prove to you that TROY Reversibles can save you big money. Remember the Reversibles come in Platform Trucks also.

If Hauling At One-Sixth To One-Half Your Present Cost Interests You, Get Our Hauling Book Z. R.

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A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

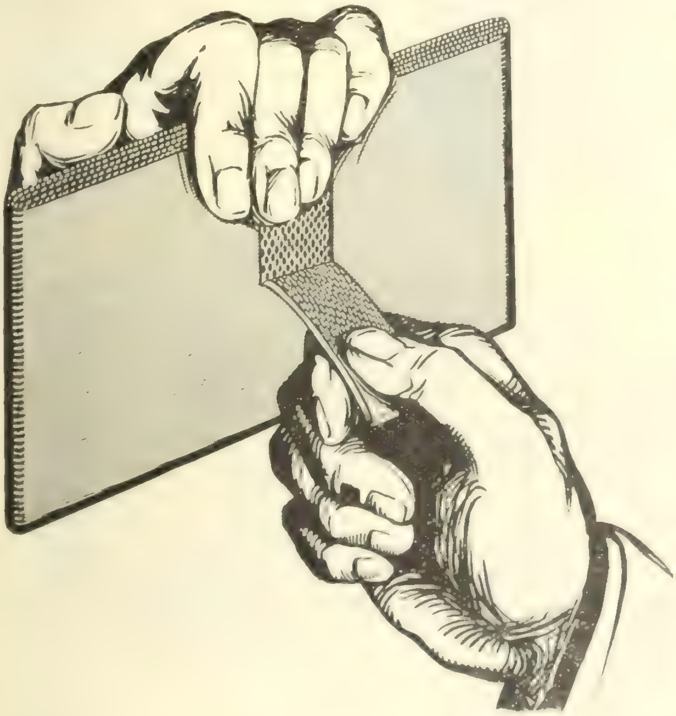
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard-twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit—and an inferior belt is dropping power all the time. Goodyear Belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS A TOTAL OF 72,000 FEET

We have just received an order for this quantity of GOODYEAR RUBBER BELTING [illegible] of interior elevators. Such an order [illegible] the quality of GOODYEAR Belting.

If we have not met the belt you require we will make it for you.

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Factory, Bowmanville, Canada

BRANCHES: Victoria, B. C. Vancouver, B. C. Calgary, Alta. Regina, Sask. Winnipeg, Man. London, Ont. Hamilton, Ont. Toronto, Ont. Montreal, Que. St. John, N. B.

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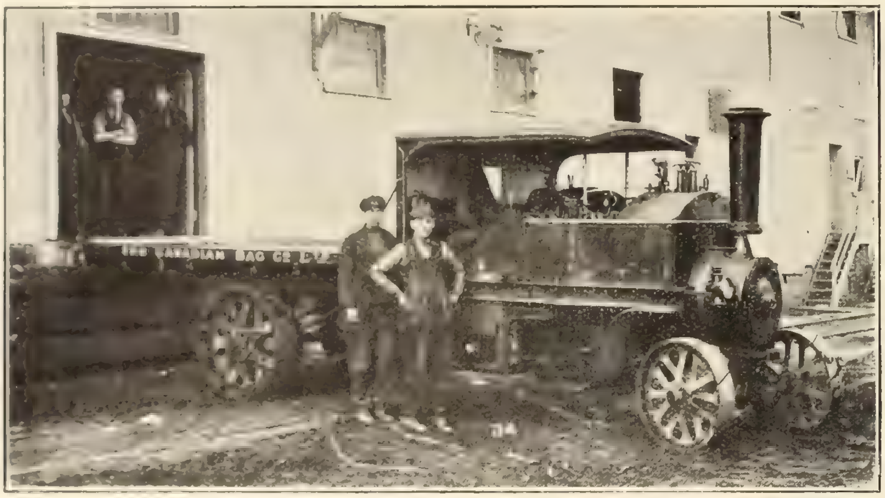
The most up-to-date, economical and reliable method of hauling Brick, Sand, Stone, Structural Steel, etc. up hills and over rough roads.



Various types of bodies may be fitted to trucks to suit conditions

"Foden" 6 ton trucks at work in Montreal.

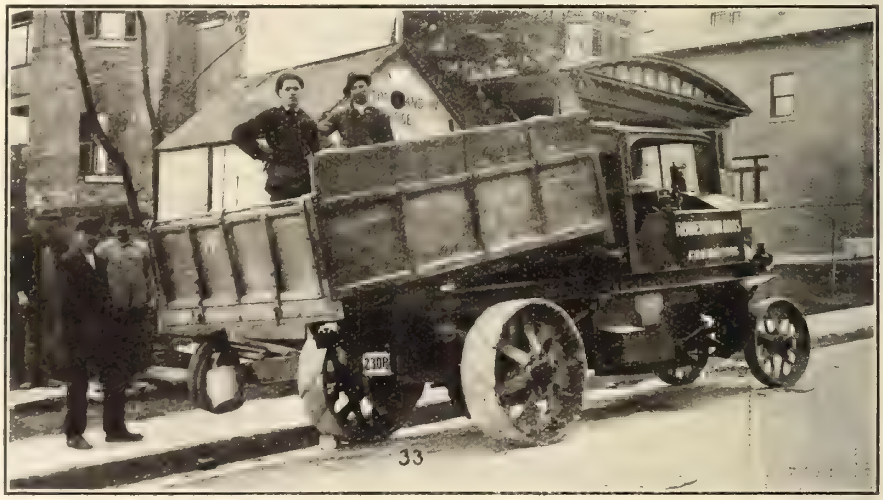
The upper cut illustrates a Lorry type and the lower a Tipper.

Note inexpensive steel tyres 12"-14" face.

20 sold in Canada last year and **21** at present on order including repeat orders.

Independent of gasoline which is soaring in price; dependent only on **Coal or Coke, and Water.**

We stock repair parts.



Unloading face-brick by hand—Box partly dumped. For unloading ordinary brick, stone, sand, etc., box may be fully dumped, mechanically

Fodens Ltd. are the oldest and largest manufacturers of Steam Trucks in the world.

We have Foden Trucks now running in Montreal, Toronto, Winnipeg and Vancouver.

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Jones & Glassco, Montreal

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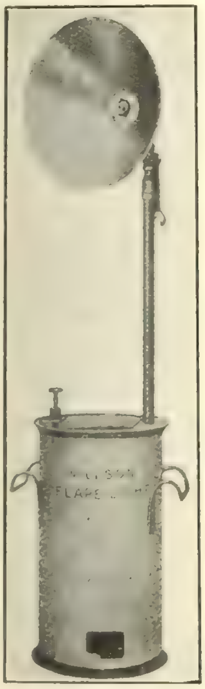

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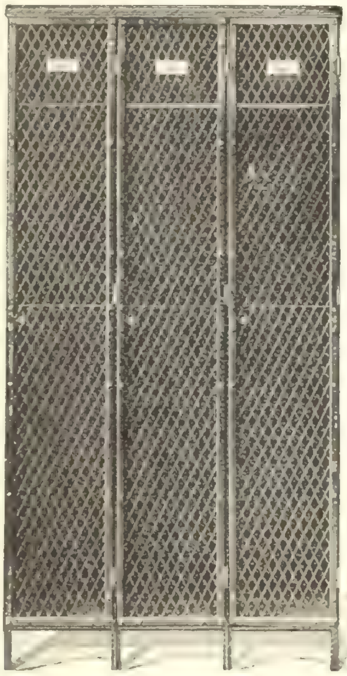

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Sewage and Garbage Incinerators

In Standard Ideal Incinerators the accumulation of the matter—both solid and liquid—is absolutely sanitary and non-infectious. The system of Incineration is complete—the solid matter being reduced to a small ash and the liquids completely evaporated.

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Standard Ideal Incinerators are made in two types:

TYPE No. 1 is intended for the use of 10 persons daily.

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Branches: WINNIPEG TORONTO MONTREAL VANCOUVER

ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY
HUGH C. MacLEAN, LIMITED
HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.
HEAD OFFICE - 220 King Street West - TORONTO
Telephone Main 2362

MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Telephone Garry 856 - 404 Travellers' Bldg.
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SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
Single copies 10 cents

Alphabetical Index of Advertisers
Page 16

Vol. 28 March 5, 1913 No. 10

A Timely Warning

THERE were some good points in the address delivered at Toronto last week before the Canadian Club by Mr. Lawson Purdy, president of the Department of Taxes and Assessments, of the city of New York. Mr. Purdy intimated that the craze for erecting "the highest building in the British Empire," was somewhat in line with the sentiment which had wrought so much havoc to health and property in the United States. The city of New York had suffered from the practice of many false ideas. The appearance of the city had been ruined and the health of its dwellers impaired. It had become practically impossible to obtain commensurate value from a great number of lots surrounded by these so-called skyscrapers. Undoubtedly Canada would do far better to emulate the example of England and Germany than that of the United States. Canada, fortunately, had not arrived at the same condition as New York, where remedial measures had become impossible.

In regard to the returns, Mr. Purdy referred to the lofty office buildings of New York as an "enormous financial fiasco." Through failure to restrict both the height of office buildings and the proportion of ground covered by them, light and air had been shut off to the extent of depreciating the value of the properties in the district, while high land values had also been localized in an extremely small area of the down-town district. At one point on Broadway, Mr. Purdy said, corner lots, 25 x 100 feet in area, were worth over one million dollars, while less than one hundred yards distant similar lots would not command $25,000.

Undoubtedly the city of Toronto will be well advised to take Mr. Purdy's observations into serious consideration. As a preventive he recommends legislation controlling both the height of buildings and the percentage of the lot which they may cover, so that adequate air space may be provided. The common-sense regulations of England and German cities, drawn up, as they are, with the weightiest consideration of health and utility, should commend themselves to Canadian cities rather than the spectacular but indefensible skyscraper pursuit. It seems a thousand pities that the city council of Toronto is empowered to over-ride regulations and authorize the erection of these twenty-storey monstrosities in such a congested and ill-planned district as that of King and Yonge streets. If the city had been laid out along intelligent lines years ago, this argument would have been unnecessary, but to make one mistake after another appears to be intolerable folly. What cannot be cured in regard to the width and general planning of Toronto streets must be endured, but further blunders should be guarded against.

It is to be hoped that owners of property in the down-town districts of Toronto will unite in the matter.

The Motor Truck in the Constructional Field

ONE is forced to the conclusion that transportation by motor truck has strong claims upon the attention of those whose operations involve any considerable haulage distance. In such cases the substitution of motor haulage for horses undoubtedly means increased efficiency of transportation and distribution. It is well known that in a variety of cases the motor truck is not economical in comparison with horse equipment. Only general conditions can be given as a criterion for the favorable operation of motor trucks. These conditions may be stated as follows:

(1) Every facility should exist for keeping the truck in constant motion the greater portion of the time. This demands the use of modern loading and unloading devices, either using the power of the truck itself or employing moving belts, elevators, chutes, removable nest bodies, the jib crane mounted on the truck, or some other mechanical means which will rapidly place or remove the load.

(2) The truck must be loaded to its full capacity when in service.

(3) The loading and unloading period of the truck must bear a small ratio to the time the truck is actually moving.

(4) The truck must not be overloaded.

(5) On reasonably good roads the truck should be operated at normal speeds.

(6) In the garage and for making adjustments and repairs, the truck should be under the supervision of an intelligent and competent man who knows his work thoroughly.

(7) The driver must be especially trained for his work after he has been carefully selected for his intelligence, interest in his work, and mechanical aptitude. Of all factors making for the success or the failure of motor transportation the driver is the most important unit.

As revealed by the increasing demand made upon motor truck manufacturers for the renting of trucks, the main drawback to the use of motor truck transportation is the cost of purchase. Unless financiers realize the opportunity for profitable conduct of such motor-

[illegible] companies it is obvious that the truck manufacturers themselves must give their incentive to the formation of such companies, by assisting promoters to find the capital, in a manner analogous to that by which the great electric companies give help to their clients in the development of water-powers. It is only a problem of financial help to the user, who is ready to adopt a new institution if he can arrange some convenient way in which to pay for it. The element of speculation to the financial backer of the public-service motor-transportation company is almost entirely absent, as there is nothing that can occur to the auto truck that is equivalent to the breaking of the leg of a horse or the destruction of an entire stable in a short while by a highly contagious equine disease like glanders. The auto truck can always "come back," unless it has been completely demolished by accidents that rarely occur.

In many departments of the constructional field the auto truck could undoubtedly be used to great advantage. The more quickly it comes into use the better it will be for the individual concerns and for the community at large by the employment of a method of transportation whcih is economical, humanitarian and successful.

Those who desire to investigate this question need not be aprehensive of the treatment they will receive from the manufacturers. One of the leading exhibitors at the Toronto Motor Show last week was most emphatic concerning this point and said that at this stage of the development of the industry it would be suicidal for the makers to effect ill-advised sales. Generally the companies will not attempt to sell trucks unless they are satisfied that the conditions of service warrant it. On the face of it, it is apparent that the interest of the manufacturer in the successful operation of the motor truck is second only to the interest of the purchaser.

Garbage Disposal in Medium-Sized Cities

THE waste matter from cities of a semi-residential class without extensive manufacturing establishments may be roughly classified as ashes, rubbish, manure and garbage. It is generally found desirable to use separate methods of disposal for these four classes of materials, each class presenting its own problems. The problems arising in the proper disposal of the last of the classes above mentioned, garbage, were recently discussed by Mr. Samuel A. Greeley, in a paper presented before the annual meeting of the Illinois Society of Engineers and Surveyors.

Mr. Greeley said in part that the methods of garbage disposal suitable for such conditions as exist in cities of this class are, in general, by burial, by feeding to pigs and by burning. The applicability of these methods of disposal in each case depends upon local conditions.

Dumping garbage in vacant, low-lying lands when done in an unrestricted way cannot be condemned too strongly. But when properly done, so that burial of the garbage results, the method is effective and cheap.

The successful disposal by burial depends upon the activity of the bacteria in the the soil. This activity results in a mineralization of the organic matter and when conducted in the presence of sufficient air or oxygen no putrefaction, with resultant odors, takes place. Mr. Greeley states that the following conditions must be observed if the method is to be applied with success: (1) The garbage must not be buried so deep that bacterial activity is reduced, nor must the garbage be spread in a thick layer on the surface of the ground. (2) The ground should be sufficiently open and drained so that the air can penetrate. (3) The garbage must not overload the soil or the bacteria, but must be sufficiently diluted so that mineralization can proceed on an aerobic basis.

The following three methods have been practised successfully: (1) The garbage can be spread on the ground and ploughed in at sufficiently frequent intervals to prevent nuisance. (2) A better method, in Mr. Greeley's opinion, is to bury each day's garbage in a shallow trench, covering it with the excavation from the trench made for the disposal of the next day's garbage. This method has been practised successfully in Milwaukee and Columbus. (3) Finally, the so-called "dilution method," as practised at Essen, Germany; Davenport, Ia., and New Orleans, can be used. This method consists in dumping the garbage onto low ground and "diluting" it with a sufficient quantity of ashes, street-sweepings, building excavation and similar materials.

Experience indicates that for open soil about 1.5 acres will be required to handle each daily ton of garbage, the same soil being in condition for re-use after two years. For heavy soils the time required for the complete assimilation of the garbage will be four years, and the area required per daily ton of garbage will be about 3.0 acres. At Davenport, where the dilution method is used, 1.3 cu. yd. of diluting material is required per ton of garbage. The total cost per ton, including rent of land, labor, upkeep, etc., is said to be 40 cents for Milwaukee and 50 cents for Davenport.

According to Mr. Greeley there are many cities in

COST OF COAL-FIRED GARBAGE INCINERATION PLANTS

Location	Date of Erection	Rated Capacity, Tons Per 24 Hours	Kind of Construction	Material Burned	Total	Cost Per Ton Rated Capacity
Milwaukee	.. 1901	150	Brick chimney and building	Garbage	$92,000	$612
Oak Park, Ill. ...	.. 1905	45	Brick chimney, good building	Garbage	11,000	245
Ft. Douglas, Utah	.. 1906	20	Steel stack, cor. iron building	6 parts manure, 1 garbage	4,500	225
Terre Haute, Ind.	.. 1907	40	....	Garbage and night soil ..	25,000	625
Muskogee, Okla. ...	.. 1911	70	....	Garbage	23,000	330
Oak Forest, Ill. ..	.. 1912	24	....	Garbage	12,000	500
Lake Forest, Ill.	Bid.	23	Brick chimney and building	Garbage	12,400	1000
				Average		$505

the United States, both large and small, in which part or all of the garbage is fed to pigs. A considerable difference of opinion exists as to the safety with which garbage from crowded centres of population can be used in this manner. In Los Angeles the garbage piggery was investigated by the grand jury, and the conditions found were severely condemned. He states, however, that the method has been practised with success in New England for many years. When this method is employed each city in his opinion should have its own pig farm or should enter into a contract under carefully prepared specifications.

About seventy-five pigs are required per ton of garbage per day. For a city of 50,000 inhabitants, therefore, from 1200 to 1500 pigs would be required. The equipment at the farm should include tracks and cars for distributing the garbage along concrete feeding platforms, substantial and well kept sleeping and roaming pens, tanks for sterilizing the garbage, apparatus for vaccinating the pigs, a means of disposal for the unconsumed garbage, by burial or otherwise, and plenty of washing facilities.

Where one central farm is not available and under proper control, other precautions should be taken. Frequently in small cities a part or all of the garbage is removed by farmers.

Disposal by Incineration

For cities with a population in excess of about 30,000, Mr. Greeley recommends some method of incineration. For this purpose the coal-fired or so-called low temperature type of incinerator is, in his opinion, best adopted, though the high-temperature type, not employing fuel, is more suitable for larger communities.

Tests conducted on coal-fired plants have shown that the cost of the coal for this service is about $4 per ton. On the basis of these tests the fuel cost may amount to as much as $1 per ton of garbage burned. In practice the amount of coal required for complete combustion is not always used, with the result that unburnt gases and odors escape from the chimney.

The labor costs for the operation of such a plant are said to be not excessive, but as a general rule the life of the furnace is short, often not exceeding 10 years. In Mr. Greeley's opinion what is needed to bring this type of plant up to satisfactory efficiency is more care on the part of city officials in drawing up specifications and in using sufficient coal to produce reasonably complete combustion.

He cites as an advantage of this type of plant that the ashes obtained can be dumped in low places, on new roads or elsewhere. This feature reduces the size of the furnace and its first coat, and is particularly important in small residential cities where few ashes are produced during the summer months.

The cost of construction of several incinerators of this type are shown in the table on the preceding page.

As distinct from the coal-fired garbage incinerators, the high temperature furnace is designed to burn mixed refuse containing sufficient carbon from the ashes and rubbish to maintain combustion. This material is charged in relatively small quantities directly onto the grates, of which there are two or more. A forced draft of heated air passes through this grate, directly oxidizing the organic matter. Temperatures in excess of 1200 deg. Fahr. are maintained, thus insuring complete combustion.

The first cost of construction of this type of plant ranges from $700 to $1,000 per ton capacity, as against $500 for the coal-fired plant. A greater capacity per ton of garbage is also required to provide for the necessary quantity of ashes and rubbish. The cost of operation varies, depending upon the local value of the steam generated.

According to Mr. Greeley, no high-temperature incinerator has yet been built for a small city. The smallest single furnace unit in operation in this country is at Clifton, Borough of Richmond, New York City, which has a capacity of 45 tons per twenty-four hours, sufficient to serve a population of 30,000 to 40,000 people.

Much has been written about the harnessing of the Mississippi at Keokuk for the hydro-electric generation of 200,000 horse power, but it has been difficult to impress the fact upon people that some of the things done in this undertaking are bigger than the same kind of things at Panama. Popular Mechanics states that the dam that now harnesses the Mississippi is the biggest of its kind in the world, the power-house is the largest ever built, and the lock which the Government required the engineers to build around the dam is bigger than those of the Panama Canal and the dry dock alongside is large enough to accommodate practically all the steamboats that were navigating the upper Mississippi last autumn. The Gatun Lock at Panama is considered an exceptionally big engineering achievement of its kind, yet the Keokuk Lock is just as wide—110 ft.—and has a lift of 40 ft., whereas the lift at Panama is 28 ft. 4 in. The steel gates at the lower end of the lock weigh 1,000,000 lbs. each, and are so thick that two wagons could pass each other on the top edge.

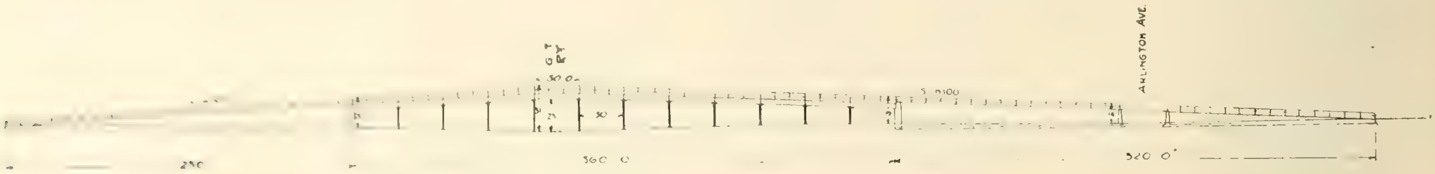
A combined sprinkler and heating system is in use in a large cotton mill in New Bedford, Mass. The building measures 237 ft. by 300 ft., with a basement and one storey, covered by a saw-tooth roof. The sprinkler system is supplied by an 8 in. pipe from the yard mains and a steam pump. In the basement the entire sprinkler system is used for heating, no other heat being provided. The sprinkler heads are of the Grinnell glass button type designed to melt at about 160 deg. Fah. The hot water has an average temperature of about 200 deg. Fah., and at times reaches a maximum of 245 deg. Fah. According to Mr. Gorham Dana, of the National Fire Protection Association, overheating of the sprinklers is prevented by placing them in offset pipes about 12 in. long and ½ in. in diameter. These offsets are 3 in. above the main pipe and connected to it by a ½ in. elbow and nipple. It is said that the action of hot water on the iron pipe causes a segregation of free nitrogen from the air in the water, and this gas collects in the space adjacent to the sprinkler heads. The gas acts as an insulator, and as there is no circulation of water through the offset pipes, such heat as reaches them by conduction is radiated into the atmosphere before it has a chance to melt the fusible caps.

An owner of a building under construction, under a contract providing for payment of the price on completion of the work, who refuses to permit the contractor to complete the work, is liable for the contract price, less payments made, and [illegible] him for the amount paid for finishing the building.

Bronson Avenue Viaduct, Ottawa

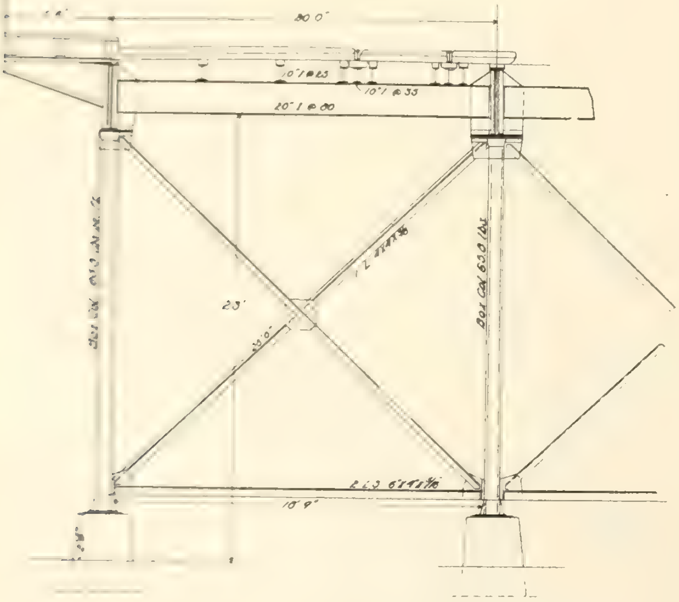
The Bronson Avenue Viaduct is to be built by the City of Ottawa and the Grand Trunk Railway Company over the G. T. R. tracks and is designed for heavy highway traffic.

The total length of the structure is 910 feet, and the width 52 feet, made up of a 40 ft. roadway and two 5 ft. 6 in. sidewalks. The higher, or central, portion of the structure is 360 feet in length and of steel construction. On general section this part is supported by three box columns (65.8 lbs. per foot) placed longitudinally 30 feet apart. The diagonal bracing is composed of 4 in. x 4 in. x ⅜ in. angle iron. The sidewalk is bracketed out from the main structure 5 feet 6 inches with a 5-16 inch web plate. The guard railing on the sidewalk is 4 feet 7 inches high and of 5 in. x 3¼ in. x 5-16 in angle iron. The steel in the structure amounts to 860,500 lbs.



Sketch elevation of proposed viaduct at Bronson Avenue, Ottawa

The retaining walls are built of concrete and are 3 feet 9 inches at the base, and 1 foot 6 inches at the top. They are reinforced with 1 inch square iron bars spaced 12 inch apart. The batter on the face of the walls is 1 in 24, and at the back 1 in 12. The wall at its highest part is 20 feet 9 inches.



General section, Bronson avenue viaduct

Arlington avenue will be brought up to the grade of the viaduct, a height of 9 feet by two approaches of earth filling held in place by the concrete retaining walls. The grade on both approaches to the viaduct will be five per cent.

The retaining walls, concrete abutments, earth filling and floorings will be constructed by the city, and the steel bents and stringers by the Grand Trunk Railway Company.

The total cost of the viaduct will be approximately $90,000.

High Grade Concrete Slabs and Brick

Concrete slabs and brick are now being produced that are as fine in grain and structure as high-grade porcelain, showing an equally fine polish. The secret of the process, states Concrete and Constructional Engineering, consists in grinding the aggregates to as fine a powder as the cement. The mixture, one cement to as high as twelve of aggregate, is then dampened just sufficient to pack well when pressed in the hand. It is then subjected to high pressure in strong iron moulds, up to 5,000 lb. per square inch. The best results are obtained in slabs or plates slightly under 1 in. thick. The pressure is applied in four or more strokes. After each stroke the pressure plate is removed to permit the air to escape. After each stroke the pressure is increased. The object of grinding the aggregates to the same fineness as the cement is to prevent forming an arch in the stone, which always takes place where high pressure and coarse aggregates are employed. Then, again, if the pressure applied to the concrete exceeds the crushing strength of the aggregates, the aggregates will grind at the contact point in the mass, leaving powdered contact points which weaken the concrete. This defect is entirely overcome by using a finely powdered aggregate. It will be seen that high pressure and coarse aggregates are inconsistent for fine work. Coarse aggregates can, however, be used where the mould produces forms in the shape of an arch, and the pressure applied is below the crushing strength of the aggregates. It is extremely bad practice to use high pressure in moulding concrete blocks over 4 in. high, on account of the danger of the arching of the aggregates. Tamping square or hollow concrete blocks is always to be preferred for sound work.

The Dusseldorf Fire Brigade are building a model for the sole purpose of testing the dangers of theatre fires and the best means of rendering theatrical buildings proof against fire. A small structure is to be built on a site measuring 50 ft. by 80 ft., with the auditorium 30 ft. and the proscenium 40 ft. high. The main part of the building is to be of steel and ferro-concrete. A special entry will permit accurate observations to be made both in the front and the rear, and two kinds of fireproof curtains are to be fitted. Seats are to be installed with the intention of testing several different processes for rendering them fireproof.

The production of limestone in the United States and the value of the product exceed that of any other stone, according to the United States Geological Survey. The value of the limestone produced during 1911 amounted to $33,897,362, showing a decrease of $706,316 from the figures of the previous year. The decrease in value was chiefly in limestone used for fluxing. These figures do not include the value of a large percentage of the stone used in the manufacture of lime and Portland cement.

Selecting and Specifying Protective Coats for Iron and Steel

By J. Cruickshank Smith[*]

¶ In Mr. Smith's article the painting of structural steel is considered from a true engineering viewpoint with regard especially to the economic maintenance ot industrial plants and structural work. He divides his consideration into three parts: First, the paint itself, its composition, color, physical condition and constituents; second, the surface to be painted, its necessary condition and preparation; third, the paint film, its production and important physical qualities. He concludes with a definition of some simple, practical methods for testing paints.

OF all the adjuncts to engineering and general constructional work, none has assumed greater importance during the last few years than protective paint coatings, which may be likened to the cuticle of the human body, protecting the tissues from external influences. From the decorative and artistic standpoints paint has always been and will continue to be a matter of moment; but of late years the attention of engineers and architects has been strongly focussed upon it because it represents the final means, within the control of the designer or builder of a structure, whereby the latter can be handed over to the owner and afterwards maintained in a fit condition to withstand the ravages of time and other collateral destructive influences. In other words, paint has come to be regarded as a highly specialised protective material, and as such it merits all the consideration that designers or builders or owners of property can give to it.

No reflective person will ignore the paramount importance of the outer protective film which is applied for the purpose of preserving a bridge or a chimney stack or railway rolling-stock or a battleship. Our argument applies equally well whether the structure be of steel, or wood, or stone, or cement; but for the purpose of this article we shall confine our attention to iron and steel. It is evident that the cost of maintenance of any iron or steel structure will be enormously increased if the protective paint coating deteriorates rapidly and has to be renewed within a comparatively short time, because the cost of repainting is always great, and over a term of years may become enormous. Hence the necessity for specifying and using protective coatings which yield high "durability-figures."

$$D \text{ (durability figure)} = \frac{120\,c}{t\,(12p + lc)}$$

in which c = spreading capacity of paint in square yards per hundred weight one coat.
t = estimated number of times the structure will require painting in twenty years.
p = price of paint in shillings per hundred weight.
l = cost of labour in pence per square yard per coat.

The need for protecting iron and steel from rusting and ultimate deterioration and destruction depends on even deeper and more scientific grounds than are at first sight apparent. The fundamental role of a true protective paint is to prevent or at least to minimise, waste—waste of the structural metals employed, waste of the fuel and materials used in producing these structural metals, waste of time, waste of money. There is deep significance, therefore, in the earnest attention which for some ten years past scientific and technical men, both in America and in Britain, have been devoting to the elucidation of the problems which surround the problems incidental to industrial corrosion, and to the designing of paints which shall be protective in the true sense of the word.

Now it will be readily admitted that as a rule neither the engineer nor the architect is a trained chemist or analyst. Still less is he a paint technologist, and the question therefore arises, how can the engineer differentiate between the innumerable articles which compete for his patronage, and how is he to determine which, if any, of them will be likely to effect the essential purpose of a reliable protective coating? The selection of suitable material is a matter of no small difficulty, because although the arguments of all the competing manufacturers are different, they all agree in one particular, namely, that each particular make or brand of paint is the best. Thus the advocates of red lead, of iron oxide, of graphite, of leaded zinc, of oxide of zinc, vie with each other in extolling the merits of their particular hobbies. The "pure paint" exponents rage furiously with the "mixed pigments" enthusiasts, while all the time the interminable argument goes on —is the pigment or the vehicle the life of the paint?

In the midst of such strife and conflict of opinion it is evident that the engineer who desires to exercise an intelligent control over the selection of protective coatings for his structures must leave details to the experts, and confine himself to broad principles founded on experience and organized common sense and to such scientific facts as are now accepted by technical men who have specialised in the department of protecting iron and steel.

What are these broad principles and fundamental and accepted facts?

They group themselves naturally under one or other of three headings, each of which we shall briefly examine in turn.

I. The Paint Itself

(1). **Composition.** Attempts on the part of amateurs to specify the component parts of protective paints are usually foredoomed to failure. The onus of designing the paint and of adjusting the proportions of its component parts should devolve on the paint manufacturer, who, if he knows his business, will require to investigate the nature and condition of the surface, the exposure of the structure, and the local condition to which the paint will be exposed during and after drying. Any other procedure is tantamount to letting a patient prescribe for himself, or permitting a layman who orders a steel ship to dictate to the naval architect the kind of plates he shall use.

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[*] In the Engineering Magazine

The precise nature of the pigment, therefore, and the selection of the liquid vehicle, are matters which (within certain limits) should as a rule be left to the expert manufacturer. Nevertheless, there are certain recognized rules in regard to such matters which it is well that those who specify or use protective paints should be conversant with. For example, certain pigments are recognized as possessing properties which tend to make them specially suitable ingredients of the priming coats. Thus red lead, oxide of zinc, and a few other pigments possess special beneficial properties in this respect, where as hydrated carbonate of lead, barytes, and sulphate of lime are not as a rule considered satisfactory anti-corrosive materials.

(2). **Colour.** This may not at first sight appear to be of fundamental importance, but a little consideration will show that the colour of a paint necessarily depends on that of the pigments composing it. As a rule, therefore, the hues associated with "chemical colours" should be avoided, for example—Prussian blue, Brunswick green and the bright chemical reds. Broadly speaking, tints containing a considerable preponderance of white are to be preferred for protective coatings, the sole exception being graphite paints which possess definite protective properties when properly prepared.

(3). **Physical Condition.** The physical state or condition of the paint as a whole and of its component parts is a matter of supreme importance. Fineness of grinding is now regarded as a fundamental principle in good paint-making, and with this must be associated the proper degree of fluidity and spreading power, because on these properties depends not only the economic side of the question (that is, the cost in respect of materials per square yard of painted surface) but also the thickness and tenacity of the paint film. On the correct proportioning of the solid and liquid parts of the paint will also depend the capacity of the film and the capillary actions which may be set up between the pigment and the vehicle. This latter point is very important because it has been found that after a paint has been spread over a surface in the form of a film the pigmentary portion tends to arrange itself according to definite laws, and on the mode of arrangement of the particles will depend much of the ultimate protective value of the paint.

(4). **Volatile Constituents.** These should be eliminated as far as possible, for two reasons. First, a preponderance of volatile ingredients tends to the formation of a loosely bound film after the spirituous matter has evaporated into the air, and secondly, the process of evaporation is liable to set up strains and stresses in the paint film which may reduce its protective capacity and in particular tend to reduce its impermeability.

(5). **Moisture** should be absent from protective paints, and some paint manufactureres now subject not only the pigments but also the liquid vehicles to special treatment before their amalgamation into the paint, in order to render the latter practically anhydrous. Traces of lime or other soaps are frequently present in paints, and these are sources of weakness in protective coatings for the reason that such compounds are more or less soluble in water, and a paint film containing them is rapidly disintegrated when exposed to rain. A trick which has gained ground among a certain class of paint manufacturers of recent years is to aim at the production of a sort of emulsion, this process considerably cheapening the paint. Such paints are regarded as of indifferent value for protective purposes. Everything of an acid nature should be excluded from protective paints which have to be used on iron or steel.

II. Surface To Be Painted

There are two main rules to be observed in connection with the surface on which protective paint is to be applied:

(1). It should be perfectly clean and free from moisture, greasy matter, rust and mill-scale. It is frequently difficult in practice to secure this condition, but where permanent results are desired no pains should be spared to ensure a perfectly clean metallic surface.

(2). Efficient protective results can be looked for only if the surface is brought to a uniform bearing. All minute holes, cracks, fissures or apertures between plates, bolts and the like should be filled with a suitable "filling" or "stopping" before painting is proceeded with. It is just these openings and inequalities in the surface which form nuclei for corrosion, owing to the lodgement they offer to moisture. The condition of "metal-to-metal" is particularly objectionable, as local galvanic action is thereby excited, and this inevitably induces corrosion. A protective paint film to be effective must be continuous over the whole surface, and this result cannot be secured unless the said surface is made prefectly solid and continuous in the first place.

III. The Paint Film

(1). The rate and nature of the drying of the films is very important, and will depend largely on the skill with which the ingredients of the paint have been amalgamated in view of local conditions. Drying should proceed uniformly throughout the whole depth of the film; otherwise a skin will form on top of the film which will impede and may even entirely prevent the drying of the paint beneath.

(2). The drying should be so regulated that it proceeds neither too quickly or too slowly. If it proceeds too slowly, the paint is unduly exposed to atmospheric conditions before it is in a condition to resist them. If on the other hand the drying is too rapid, a state of strain will be induced in the film. Severe chemical action may likewise be set up which will probably result in rapid deterioration.

(3). The great object to aim at in the final or "weather film" of a protective paint is to render it as impervious as possible to moisture. It has been conclusively proved that protective paints will effect their purpose in strict relation to the degree of permeability to moisture which they possess. It is for this reason that many modern experts prefer the final protective film to consist largely of pigment, their view being that greater impermeability to moisture is secured. This view has much to commend it, always provided that the physical condition of the pigment is suitable. It would, for example, be useless to load the final protective film with badly ground or angularly-shaped particles of pigment. Hence the practical rule that the greatest protective value is obtained from paints which in their finishing coats partake of the nature of highly finished enamels. This rule indeed applies with equal force to any protective paint, due regard being had to the essential physical differences between such widely divergent materials as graphite and oxide of zinc.

So much stress has been laid in the course of this article on the subject of fine grinding and perfect incorporation of the various constituents of a protective paint that it may rightly be asked, in what manner is an engineer to satisfy himself that a sample of paint submited to him fulfils these conditions? Reflection will show that if a paint were infinitely well ground and mixed the separating out through the action of gravitation of the solid from the liquid portion would take an infinitely long time, owing to the well-known scientific fact that infinitely small spheres of solid matter suspended in a mobile medium of much lower specific gravity than themselves do not obey the ordinary laws of gravitation.

Consequently, the simplest test to apply to determine whether protective paint is properly ground and mixed is to observe the length of time which elapses before a definite settlement of the solid matter takes place. Protective paints are manufactured which can be kept for six, twelve, or even twenty-four months without any appreciable separation of pigment from vehicle taking place.

A practical test which was originally worked out by the testing chemist of one of the great American railroads consists in pouring a portion of the mixed paint on a glass plate, standing the latter up at an angle of about 60 degrees, and observing the degree of separation of pigment and vehicle which takes place when the paint is allowed to run down the glass. A comparative test of this nature between a range of paints will disclose striking divergences, and the test may be made more severe by thinning the paint with a little raw linseed oil and by carrying out the experiment at temperatures above the normal.

The attention now devoted not only by constructional engineers but also by factory owners to the efficient protection of their plant and machinery and the iron and steel work connected with the fabric of their buildings is enormously greater than it used to be. The prevention of waste in all departments of industrial activity is a theme which engrosses widespread attention, and it is now no uncommon thing to find the works manager of an industrial concern anxiously discussing the question of the most suitable protective paints to use for his buildings and machinery. The engineer who has made an intelligent study of modern protective coatings is here able to be of the greatest assistance to the works engineer, who is frequently entirely out of touch with modern advances in paint technology. The great stumbling block as a rule is the question of the cost of the paint, but a little reflection will show, and a study of the formula given in an earlier part of this article will prove, that the cost of materials is in reality the smallest and least important of the factors which govern the durability figure. Durability in service far outweighs the mere question of cost of materials.

May we not then claim for protective paints and coatings a place in the category of "engineering materials?" And if this claim be conceded, does it not follow as a necessary consequence that it behoves engineers to make themselves cognisant with the great advance in paint technology during recent years? Only by closer association between manufacturer and consumer will this result be achieved.

Concrete Pavements—Methods and Cost of Construction*

By Carl M. Boynton

IN discussing the subject of concrete pavements, I propose to adhere strictly to the subject of plain and reinforced concrete, without discussing any of the many patented materials used for the surfacing of the concrete. Such surfacing has many strong advocates, but as the untreated pavement is a success on all counts, I will deal with it as such.

The two methods of concrete pavement construction which have been used to such an extent throughout the country as to be accepted practically as standards, are single-course and two-course work. The relative cost of materials that can be obtained will be the determining factor as to the type of pavement to use. If hard, durable crushed rock or a clean, hard gravel cannot be obtained at reasonable cost, then one-course work should not be undertaken.

Before discussing these types separately, there are a few general essentials in the construction of all concrete pavements which should be considered.

The wear to which a concrete pavement is subjected is due to abrasion and impact; therefore, in planning and building a concrete pavement every effort should be directed toward obtaining the highest degree of resistance to such action. It is apparent that to obtain high abrasive resistance in a pavement, an aggregate having high resistance must be used. The same will apply to impact. Therefore, it is essential that concrete for a pavement must be composed of a hard, tough aggregate. But it is just as essential that the concrete itself be uniformly hard and tough, and with the proper materials this can be obtained only by the employment of methods which insure proper proportions—thorough mixing, correct consistency, and uniform distribution and compacting of the concrete over the area being paved. Sand and gravel can be proportioned correctly by wheelbarrows if the wheelbarrows are of the same capacity and each load struck off with a template to insure uniform loading. Thoroughness of the mixing and the use of a definite amount of water for each batch are quite as important as proper proportioning of the aggregate. The concrete should be distributed in a manner which will obtain uniformity throughout. These may be considered excessive precautions, but results indicate the advisability of using precise methods.

FOUNDATION

A foundation for concrete pavement is essential and should be of such a nature and so prepared that subdrainage is assured. All soft and spongy material in the sub-base should be removed, and replaced with bank-run gravel, sand, or other material equally as good, and the whole foundation thoroughly compacted with a power roller.

A flat sub-base is more easily obtained than one that is crowned, and, on narrow streets up to 20 feet in width, a better distribution of the concrete results by placing the crown entirely in the pavement proper. A careful checking of the elevations of the foundation is important in order to insure the proper thickness in the finished concrete.

No pavement should be less than five inches thick at the outer edge or curb, nor for economical work should it be greater than eight inches at the crown.

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*Abstract of paper read before the American Society of Engineering Contractors.

In pavements of greater width than twenty feet, the desired crown may be obtained by forming both foundation and concrete. An argument often suggested in favor of the crown on the sub-base is that it may more readily drain; but with any kind of foundation material permissible for first class paving, such a point does not seem well taken, as the water would be cared for amply by sub-base drainage, particularly as but little water will find its way through the concrete into the foundation, but must come through the sub-base material itself up under the pavement.

ONE COURSE WORK

The one object to be desired in all construction work, and particularly in the use of concrete, is simplicity. The minimum number of operations required to obtain the desired result reduces the probabilities of error and poor workmanship. One-course work, that is, the construction of a pavement where the mixture is similar throughout and the work is done in one continuous operation, is therefore desirable. The points to be considered in a study of this type of pavement are: Materials, Proportions, Methods of Mixing and Placing, Thickness of Pavement, Expansion Joints, Finishing and Curing.

Materials—Aggregate

The coarse aggregate of one-course work should be well graded gravel or crushed rock, ranging in size from one-fourth inch to one and one-half inch in largest dimension.

The fine aggregate should be clean, coarse sand, well graded from fine to coarse, all of which should pass through a No. 4 sieve, and not over five per cent. pass through a 100-mesh standard sieve.

The cement should be standard Portland cement, complying with standard specifications.

Proportions

The leanest concrete which should ever be used in a one-course pavement is a 1:2:4 mixture. Such proportions will usually give a satisfactory finish and are suitable for streets and roads of moderate traffic. For all other traffic conditions richer mixtures should be used. In some cases concrete composed of one part cement, one and one-half parts sand, and three parts coarse aggregate has been employed with splendid success, and with similar material and under like conditions 1:2:3 mixtures seem to give equally as good results.

Mixing and Placing

As the pavement is dependent for its success upon uniformity, the mixing should be done mechanically in a type of mixer which insures the uniform proportioning of all materials throughout the mass. The concrete should be of a consistency requiring but little tamping to flush the surface with water.

The usual method followed in placing concrete is that of placing the concrete directly on the street from the mixer, and not handling it the second time by wheelbarrows. This is sometimes accomplished by the use of a boom and bucket attached to the mixer, the bucket usually being of the bottom-dump or tilting type, the boom swinging in an arc of 180 degrees. Another method is by the use of a spout or flume from the mouth of the mixer, discharging the concrete directly upon the road, this spout being so attached that it may be swung easily in an arc of one hundred and eighty degrees and the mix discharged while the spout is in motion. Some type of spouts have broken connections so that after discharging through the extreme length sections may be removed and the concrete placed closer to the mixer. Either method is adapted to economical work.

Thickness

The thickness of the pavement is a very important question and one which experience alone can answer. Developments to date seem to indicate that at the crown of the road nothing less than seven inches should be used. In country highways the minimum thickness of the edge should be six inches, while in some city pavements where the edges are protected by curbs a minimum of five inches is allowable.

Expansion Joints

It is admitted that expansion and contraction must be taken care of in concrete pavements, but the amount of movement which should be provided for and the distances at which joints should be placed, are points not definitely settled. Joints lengthwise through the pavement are objectionable, therefore, in most cases the concrete is placed in a continuous sheet or slab from edge to edge with joints across the pavement, varying from fifteen to thirty feet, according to the idea of the engineer writing the specifications. Pavements laid with three-eighths joints every twenty-five feet have proven very satisfactory and this arrangement of joints is being accepted as good practice.

Since the edges of the joints are apt to be chipped, it has been found advisable to protect them with plates or angles. Specially prepared plates with anchors sheared and bent back are coming into common use, and, though they add about five cents per square yard to the cost of the pavement, it is undoubtedly economy to use them. Such plates, 3-16th inch by two and one-half inches are being used in the Wayne County (Michigan) roads and are proving very satisfactory in this work. They are clamped together face to face with a strip of one-fourth inch tarred felt between, and are set up and concreted into position. The effective joint, so far as the expansion is concerned, is reduced to whatever the felt can be compressed.

In case of street work where curbing is used, longitudinal joints should be provided between the pavement and the curb. These do not require the protection of metal plates; for such longitudinal joints a plastic filler is preferable to a tarred-felt filler. All joints not protected by metal should be rounded to a radius of one-half inch.

Finishing

It is generally accepted that the best method of finishing a concrete pavement is to wood-float the surface after it is struck off with a template. Sometimes the floated surface is brushed with a stiff fibre broom; but this is not necessary and is not recommended.

It is considered advisable to corrugate all grades of five per cent. or more. At Davenport, Iowa, the corrugations were made with a roller on which the projections were staggered. They were six inches long; four inches on the roll were staggered.

Curing

It is impossible to put too much emphasis on the importance of thorough and proper curing of pavements. After the concrete is placed it should be covered with earth, or other absorbent water-retaining materials, which should be kept damp for a period of not less than five days, so that the moisture in the concrete, necessary to its proper hardening, will not be lost. The pavement should be protected for at least another period of five days before traffic is allowed upon it.

TWO-COURSE WORK

In some localties, due to available materials, two-course work is better and cheaper than single course. Such a condition exists where the coarse aggregate is not tough enough to resist traffic, and granite screenings, or a clean sharp sand, can be obtained for the top course. Two-course work requires more careful handling and more experienced labor in its construction than one-course. The difficulty in bonding fresh concrete to partially hardened concrete is well known, and it is this feature that must be watched carefully in two-course work.

The bottom course should consist of at least five and one-half inches of well-made concrete. The aggregate should conform in general to that described for one-course work, but may consist of material of lower abrasive value.

The top course, one and one-half inch in thickness, should be composed of a 1:1½ part cement and fine aggregate in which the aggregate is either granite chips graded from fine to one-half inch in size, or coarse sand well graded from fine to coarse, the largest particle of which will pass a one-half inch screen.

Mixing and Placing

The main difficulty encountered with two-course work is in placing the wearing course upon the base in such a manner as to ensure a perfect bond. A simple method of ensuring successful work is in the use of two mixers—the secondary mixer being used for the top course. In this way the placing of the top is carried along simultaneously with the placing of the base.

REINFORCED PAVEMENT

The determination of the use of reinforcement in concrete pavement will depend upon the type of foundation and width of pavement. Reinforcement may be used in either single or two-course work and is particularly designed to care for slight settlements of filled-in foundations and to guard against construction cracks developing where the pavement is wide. In any road where a new fill of over two feet is made, and the material used is other than sand or gravel, the pavement should be reinforced no matter what the width of the road. No amount of compacting by roller or puddling can effectively settle such a fill so that no further movement of the foundation is probable after the placing of the pavement.

One condition often arises in towns or cities in the laying of a sewer down the middle or side of a street just prior to placing a pavement. Where such excavation is necessary, and the pavement is laid upon the fresh fill, sufficient reinforcement should be placed near the base of the pavement to give additional strength at such a point.

The type of reinforcement which is most economical in price and handling is the wire fabric. The weight of fabric to be used in this reinforcement is still an open question and must be determined to suit each specific case. Light inexpensive reinforcing has been advocated in two-course work; the reinforcement to be placed upon, and pressed into, the still plastic base. Being slightly undulating, it insures that no line of cleavage can possibly develop between the two courses, and in addition it imparts greater strength and security to the pavement. For single-course work the reinforcing is placed about two inches from the surface.

COUNTRY HIGHWAYS

The advent of the motor-driven vehicle has made obsolete our "good roads" of a few years ago; no type of gravel or macadam road can stand such traffic. The cost of the better types of pavement has discouraged their use, but concrete, by providing a permanent and economical material, has solved the problem of paving country highways.

An important point in favor of permanent pavement in the country is that the farmer has the road to use in the season when he most needs it. The heavy farm trucking is done in the spring and fall. At such times most country highways are made very heavy and hard to travel by reason of the mud-holes and ruts developed through the action of rains and frost. The concrete pavement on the other hand is mudless and dustless all the time. It is necessary to adjust the cost per mile to the importance of the road as a thoroughfare, and this can be accomplished by limiting or extending the width of the strip of concrete placed; where on a tributary road it might not be justifiable to place a strip wider than nine feet, with three foot gravel shoulders; on the main arteries leading into trade centres it would be folly to build less than fourteen to eighteen feet of concrete with three-foot to five-foot gravel shoulders.

Gravel Shoulders

The gravel used in the construction of shoulders should be a first-class road gravel containing sufficient clay or earth to cause thorough packing, that it may offer a substantial resistance to traffic. As the gravel shoulders are used only for the purpose of turning out, the wear will not be excessive, and the cost of maintenance will consequently be low.

ESTIMATES OF COST

Analysis of cost must include material, mixing and placing, expansion joints, water supply, equipment and bonds.

Materials

An analysis of the material costs of one-course and two-course work will show that the difference is so very slight as to be doubtful of estimation. However close an approximation an estimate may be, it cannot be exact, and, therefore, it will readily be seen in the following formulas that the main consideration in choice of type of pavement must necessarily be dependent upon the materials available; and the type chosen will be that to which they are best adapted. This formula is based on Thompson Taylor's Table of Proportion.

Considering: C equal cost of cement per barrel,
G equal cost of gravel per cubic yard,
S equal cost of sand per cubic yard.

Then, for one-course work of 1:2:3 mix, seven inches thick, the material cost per square yard of pavement is .325C plus .0975S plus .146G; while for two-course work, seven inches thick, composed of 1:2½:5 base, and a 1:1½ top mortar, the material cost per square yard of pavement is .342C plus .1045S plus .133G.

The two formulas show the tendency to equalize the cost by small compensating differences in the several quantities and are given here to illustrate this point.

Mixing and Placing

With good equipment and an average gang the actual cost of mixing and placing should not exceed [illegible] per square yard for seven inches of concrete. To this should be added a cost of three cents per square yard for finishing and labor necessary for handling the forms, making a total for one-course work of ten cents for mixing and placing. As has been stated there is a slight difference in the cost of placing single and two-course work, with the advantage in favor of the former.

Expansion Joints

Placing expansion joints is such a simple operation that one cent per square yard should cover the cost. To this must be added the cost of metal joint and tarred felt delivered on the job, or the cost of filling the joint with a plastic filler.

Water Supply

On city streets the water supply is not a problem; but on country highways, where it is necessary either to haul or to pipe water a considerable distance, it is advisable to make a careful survey of the situation. In estimating the cost of water the amount required for keeping the pavement damp for a period of five days must not be neglected, and as this is an indefinite quantity dependent upon weather conditions, only an approximate cost can be suggested. On the Wayne Co. (Michigan) work the water for each road is costing $3.50 per day, plus oil and gasoline required in operating the engine and pump; three dollars and fifty cents is the wage for a man looking after the pumping. Water for the Mukwanago Road in Milwaukee costs 1¼ cents per cubic yard of pavement. In this case the water is purchased from the city of Milwaukee or its suburbs. In both cases the contractor's and builder's equipment must include the necessary engines, pumps, pipings, etc.

The cost of hauling water for use in constructing country highways of concrete is often an item worthy of careful consideration. The method of supplying water by piping is considered by the majority of contractors as most economical. Where water is available under sufficient pressure the pipe line can be attached directly to the city main, thus eliminating engine and pump, but where water is taken from a well, creek or river in vicinity of work, an engine and pump will be required.

On one job in the vicinity of Milwaukee, 7,200 linear feet of two-inch pipe at $6.80 per hundred feet, cost $489.60, and the laying, $20 per mile, amounting to $27.20, makes the total cost $516.80, or $.72 per foot. On the other job 11,200 feet of two-inch pipe cost $1,008 laid, or $.09 per foot. For supplying water, the city of Milwaukee received $.005 per cubic yard of concrete mixed, and $.005 for each square yard of pavement, making a cost of $.00583 per square yard of finished pavement.

Where the construction is small, the installation of efficient pumping equipment may not be justified, in which case hauling in tank wagons can be resorted to. One team hauling tanks having upwards of 350 gallons capacity will supply a mixer of one-third cubic yard with sufficient water for a day's run, provided the haul is one and one-half miles or less. On one job of 4,800 square yards in Wisconsin, the water cost $75 for the entire work, plus the cost of hauling and pumping, which was $7 a day for nineteen days. Another contract was $10 for water and $4 a day for hauling. This work covered 3,500 sq. yds., but the haul was short and one team working half a day could keep the mixer supplied.

EXAMPLES

In discussing the cost of concrete pavements, a few examples of actual construction will help to make clear the division of expense. The first pavement I shall mention was laid recently in a small town in the central part of Illinois, totalling 5,000 square yards. The total cost of the work was $3,964.02, excluding cost of equipment, which consisted of a one-half yard Koehring mixer of the latest type and a four and one-half horse power gasoline engine, and also excluding the cost of the water for mixing and sprinkling. The pavement was forty-five ft. wide and uniformly six in. thick. The cost of the work was divided as follows: Superintendence, $140; 1,457 barrels of cement, $1,547.15; sand stone and gravel, $1,284.97; labor, $560.07; lumber and forms, $35; bitumen and creosoted blocks for joints, $48.67; coal and oil for mixer and engine, $30.75; excavation, $307.41. A summation of these figures gives the cost of this road as $4.76 per cubic yard.

During the summer, Milwaukee County, Wisconsin, constructed several concrete highways to the south and southwest of Milwaukee. Data on a two day's run from one of these jobs were collected. Twenty-four men and a one-third yard Smith mixer of the dumping type were able to place 94.1 cubic yards or 470 square yards of nine-foot road seven inches thick for a total of $364.41, exclusive of cost of grading and interest and depreciation on equipment. The materials were furnished free to the contractor on the siding nearest the work and hauled to the job at his expense.

In figuring the cost of the road, the cost of materials to the county was included with the cost of mixing and placing carried by the contractor, and are itemized as follows: 111.5 barrels of cement, $115.96; 93 yards of bank-run gravel, $94.86; water piped from the city, $19.27; Baker Protection Plates for expansion joints, $29.07; coal and oil for engine, $4, and labor, $101.25, making the cost per cubic yard $3.98 and $.79½ per square yard.

Another piece of construction work for Milwaukee County was a road eighteen feet wide and seven inches thick. The work was done by twenty men, using a one-half yard Chain Belt mixer with chute delivery. The water was piped along the road from the city as in the preceding case, but a four and one-half horse power gasoline engine was necessary to force the water up to the head required. The work recorded covered a period of four days and cost $1,128.46, exclusive of equipment and grading. The cost of piping and water for this and the preceding job was fully accounted for in a former paragraph. The cost of the work was divided as follows: 414 barrels of cement, $430.92; 92 yards of sand and 152.3 yards of gravel, $340.84; water, $60.20; Baker protection plates for expansion joints, $76.50; coal and oil for mixer and engine, $7.50, and labor, $232.50. From these figures we arrive at a cost of $4.70 per cubic yard and $.91 per square yard for the pavement.

In southwestern Michigan a short strip 798 feet long, nine feet wide and seven inches thick, of 1:2:4 concrete, cost $717.83, exclusive of grading, equipment and water. The equipment consisted of a seven cubic foot Clover Leaf Mixer, necessary wheelbarrows and shovels and lumber for forms. The gang on this road was much smaller than that of any of the other roads. Two hundred and twenty-five barrels of cement cost $234, 69 yards of sand cost $37.59, 136.35 yards of gravel cost $196.34, gasoline and oil for mixer cost $10, Baker plates cost $96 and labor $144, making the cost per cubic yard $4.68 and per square yard $.91.

Slate Quarries and Slate Industry in South Quebec

THE slate deposits in South Quebec are of sedimentary origin; the black slates belong to the Ordovizian period, and the coloured materials to the Cambrian period.

Numerous slate quaries were opened in South Quebec 30-50 years ago, no turnover could, however, be effected, and the exploitation was given up. Owing to the present standing of the markets, the quarries were re-opened and are now in activity.

The geological conditions of Quebec are very interesting. Crystalline stone masses trend in a northwesterly direction through the country, forming the "Sutton mountains," the "Stocke mountains" and the "Lake Megantic Hills." Serpentine masses are found easterly of the "Sutton Mountains" and the most important and largest slate deposits are situated here. All slates, suitable for exploitation, are found in the immediate proximity of serpentine.

The "black" slates are of a bluish-grey colour and can be split in almost a vertical line. From the geological point of view and with regard to their character, they are similar to those of Montpelier and Northfield in Vermont. The Sutton slate quarries have been exploited for some time, and are the main source of the slate industry in Quebec. The different slate deposits are described as follows:—The New Rockland slate quarry in Melbourne and the Danville quarry in Shipton, Richmond, situated near the above-mentioned serpentine mass, have been worked since 1889. The slate of the first mentioned quarry is completely fissible, free of pyrites, watertight, and of excellent quality. This quarry is 200 feet deep. The slate on the brinks was affected somehow through blasting the serpentine. This is, however, not the case with the Danville quarry, the slate of which is softer, and is therefore mostly used for blackboards, etc. This mass is intersected by clefts, and, unlike the other quarries, is not crossed by quartz veins. The chemical analysis of these two quarries, made by the Geological Survey, proved as follows:—

	New Rockl.	Danville.
Pyrite acid	65.39	61.80
Argillaceous earth	15.97	[illegible]
Iron oxydul	4.66	10.10
Mangan oxydul	0.39	0.74
Lime	0.67	1.06
Magnesia	2.99	4.52
Fixed Alkali	3.60	[illegible]
Alkali potash	...	1.46
Water	[illegible]	[illegible]

The coloured slates are red, green, mottled, and scarlet. This material is coarse and difficult to split. Very little slate of this kind was exploited in Canada; smaller quarries of coloured slate have been worked some years ago in Kingsey (Drummond), but are not now in activity. The exploitation of coloured slate in the United States is, however, important.

The raised slate is placed in sheds and sorted. The material suitable for splitting is conveyed to the splitting apparatus, where it is transformed into plates. Slate plates are sold by the square. The thickness of these plates in Quebec is generally 3-16 inch, the sizes vary between 12 by 24 inch and 6 by 12 inch. The working and splitting of slate blocks gives an enormous quantity of chips (waste), as only smooth and fissible material can be used. Frozen slate cannot be used, as it cannot be split. This is the reason why the Quebec quarries supply only 5-10 per cent. really first-class material.

The slate production of Canada amounted in 1889 to 119,161 dollars, in 1901 to 9,980 dollars, in 1909 to 19,000 dollars. Canada imports a great quantity of slate. It is mainly used for roofs, blackboards, electrical switchboards, billiard tables and walls. All the slate exploited in Canada, and 80 per cent. of the production of the United States, is used as roofing material.

The continually growing demand for slate and the successful development of the slate industry in Vermont and Maine will probably be an inducement to exploit on a still larger scale the excellent quarries of South Quebec.

World Building, Vancouver

REPRODUCED herewith is a cut of the World Building, one of the latest additions to the business district of Vancouver. This structure measures 126 feet on Beatty street and 70 feet on Pender street. It is the highest building in the city, rising to a height of 269 feet above the pavement, and its construction represented a total outlay of approximately $560,000. The outer walls are comprised of Clayburn pressed brick, with terra cotta trimmings. Altogether, $30,000 worth of terra cotta has been used. Haddington Island stone is employed up to the second storey. All the floors are maple, and the inside finish throughout is Philippine mahogany. The building is fireproofed with the Clinton fireproof fabric. The steel frame was put together by a local firm, and the contract amounted to $12,000. This is the largest single contract of the kind ever awarded in Vancouver. Messrs. Smith & [illegible] completed the construction.

World Building, Vancouver, nearing completion

Lining for Cement Kilns

A lining for cement kilns consisting of concrete composed of one or two parts by weight of ground, [illegible]-setting cement and two to three parts by weight of hard-burnt cement clinker, has been successfully used in Germany, according to The Builder. The materials are mixed with just enough water to cause the mass to cohere when pressed to gether. When heated to a temperature corresponding to a red or white heat it is said to harden quickly and retain its form and hardness in the sintering zone of a Dietsch kiln in operation. By the use of an inner cylinder 16 in. smaller than that of the kiln and 10 ft. wide as a form an 8 in. lining can be conveniently placed. Such a section of lining can be placed in a day and allowed to set in about an hour after placing and rapidly acquires a permanent set. A cement concrete lining thus placed will last from three to six months in the sintering zone of a kiln and is also suitable for the end shoot, which can be easily relined when necessary. The cost of this lining, including maintenance, is said to be considerably less than that of fire clay.

Transportation of Building Materials by Street Railways

THE question of the transportation of building material by street railways was discussed at the noonday luncheon of the Montreal Builders' Exchange. While the subject is largely of a local character, owing to the tramways company being held up in consequence of a dispute with the Council, it has also a wider bearing, and some of the points discussed are of national interest.

Mr. R. L. Werry, the secretary, pointed out the inconvenience and cost caused to contractors by their inability to use the tramways for haulage purposes. Some contractors were holding back from making agreements owing to being unable to figure on costs. The company were willing to help the contractors provided an agreement could be come to with the civic authorities. The company did not carry freight during the hours of congestion, and there was no reason to believe that the haulage of building material would interfere with the passenger traffic. Street railway haulage was cheaper than horse cartage, and although the question of motor haulage was yet in an experimental stage, it was estimated that motors were less costly than street railway haulage. The capital expenditure on motor trucks would probably mean an outlay of $300,000, and so contractors would have to rely upon the street railway as the best means of transporting material. This year it was probable that $40,000,000 would be spent on building in Montreal, many big structures being contemplated, and it was imperative that something should be done to solve the haulage problem. The city had an enormous improvement programme to carry out, and it was for the benefit of the citizens as well as for the contractors that a solution should be found.

Mr. T. A. Morrison referred to the delivery of stone, and stated that if it had not been for the street railway last year contractors would have been in a very difficult position. Carters were well enough for short hauls, but for long hauls they would have to rely upon the street railway in order to keep down the cost. He was of opinion that the city would not be able to deliver their macadam for the roads without the co-operation of the street railway.

Mr. W. E. Ramsay pointed out that Montreal was peculiarly situated as regards transportation, and that the factor of cartage was very expensive. He prophesied that in five years the cartage companies would discontinue business as it did not pay them, and now was the time to investigate the question of finding substitutes. His idea was for the street railway to establish a number of distributing stations, to which material could be carried, and this in turn could be carted away to the various points by the contractors. Motor trucks should be considered as adjuncts to the tramways.

Mr. Munn suggested that the Exchange should bring this transportation problem before the Quebec Utilities Commission, and ask them to settle the question as between the city and the street railway company.

In the course of further discussion, it was remarked that the public as well as contractors were interested in this question, as the greater cost of haulage had to be put on to the price of houses, and in turn the public had to pay.

Mr. F. Pauze, who presided, also remarked on the importance of the subject to builders and the city.

Montreal Underground Conduit System

Plans for the underground conduit system on St. Catherine street, Montreal, have been passed by the Railway Commissioners. This is the first section which will ultimately cover the city and embraces the portion of the thoroughfare from Guy street to Papineau avenue. Tenders for the work are to be called in the near future, and work is to commence about the 15th of April. The system consists of groups of 3½-inch square tile, standard lengths, for all main ducts; for service wires there are to be 3½-inch fibre conduits in groups of four on each side of the streets; another group on each side of the street will consist of 3½-inch fibre conduits, to be used one for fire alarm, two for police patrol, and one for street lighting, and one for burglar alarms. Access to the main ducts is gained through two man-holes at the corner of each street excepting at tramway crossings, where there will be four man-holes. At these main duct man-holes the current will be transformed and carried in the service conduits to man-holes, where the service wires are arranged to feed blocks of buildings.

Caked sulphate of iron, which is used in connection with lime as a coagulant for the water supply of St. Louis, Mo., is broken up by a newly devised apparatus described in the report of Mr. Edward E. Wall, water commissioner. During the year 8094 tons of sulphate of iron and 12,665 tons of lime were used in clarifying 33,864,000,000 gallons of water. The breaker for loosening the caked sulphate of iron consists of a horizontal girder supported from the bin roof, geared to make two revolutions per minute when driven by the reclaim conveyor motor, and carrying a heavy chain whose length is adjusted so that it scrapes over the surface of the cemented sulphate. The chain loosens the iron so that it is no longer necessary to send men down into the bin, but at times the lumps are so large that they will not pass through the chute leading to the conveyors and must be broken by poking through bar holes in the conical bottoms of the large storage bins.

Power from sewage is being considered at Niagara Falls. The city's trunk sewers empty into lower Niagara and it is believed that their flow is sufficient to produce power for a municipal lighting plant.

Plant of Standard Clay Products, St. Johns, Que.

Plants of Standard Clay Products, Limited

We reproduce herewith photographs of the St. Johns, Que., and New Glasgow, N.S., plants of Standard Clay Products Limited, concerning whose new organization a paragraph was published on page 69 of our issue of February 19. Since the St. Johns photograph was taken the company have added three kilns to their plant. As stated in our former article, the company are building a 15-kiln plant at New Glasgow in addition to the 10-kiln plant now in existence there. They are doubling the capacity of their fire-brick plant at St. Johns to increase the output of locomotive blocks, stove and range bricks, etc. The present fire-brick kiln battery of four kilns is to be doubled.

R. C. School, Cote St. Paul, Que.

Work is now proceeding on a school and residences in Bourassa street, Cote St. Paul, P.Q., for the Roman Catholic Commissioners. The plans are by MacDuff & Lemieux, Montreal, and show a four-storey structure on a site, 208 x 58 feet. The school is for boys and girls, and there are also residences, one at each end, for the teaching sisters and brothers. these residences being three storeys in height. The foundation is of stone, the base of the building of cut stone, with grey brick superstructure. The floors are of maple and the roof of metal, while the walls are tiled and the wainscoting of marble. There is asbestos plastering. The main school has separate entrances for boys and girls, with fire escapes in the rear, and the residences include dormitories, refectories, chapels, roof gardens, reception halls, elevators and recreation rooms. Electric lighting is to be provided.

A feature is the arrangement connecting the school with the residences at each end. This consists of fireproof sections, built of brick and concrete, with entrances and stairways (the latter of iron), which admit on one of the floors of communication between the school and the residences. Fireproof doors are provided so that in case of an outbreak the residences and the school can be shut off. On the top storeys of the fireproof sections, which really form part of the entire structure, lavatory accommodation is provided.

The contractors for masonry work are Filon Brothers; painting and carpentry, Joseph Marcotte; iron work and steel, Dominion Bridge Company; roofing, heating and plumbing, Rea & Skead; electric work, F. X. Guillevin. The cost is about $150,000.

Another Loft Building for Montreal

Yet another loft building is to be erected in Montreal. It is designed by Saxe and Archibald, for J. A. Davis and Company, Limited, real estate dealers, and will consist of ten storeys and a basement. The site is 200 by 68, and is at the corner of St. Lawrence Boulevard and Mount Royal avenue. The ground floor will consist of 10 stores, and the rest of the building will be divided into lofts, which will be lighted on four sides. The frame will be of concrete, with Indiana limestone on the exterior as far as the fourth floor, pressed brick being used for the remainder of the exterior. The floors will be concrete, and the roof of tar and gravel. Tile will be utilized in the halls, where the wainscoting will be of marble. There is to be electric lighting and steam heating. Two passenger and two freight elevators will be installed, and a sprinkler system provided.

Large Dipper Dredges

The excavation of the Atlantic entrance to the Panama Canal called into service dipper dredges of unusual size and capacity. The "Mindi" and "Chagres," which are cutting the entrance channel to a minimum depth of 42 feet at mean tide, are working entirely in rock which has been previously broken up, and they bring the material to the surface in 5-yard dippers. The dipper handles are 62 feet in length and the boom supporting the shipper shaft is 50 feet long. To facilitate the work the dredges have been equipped with steam dipper trips which have shown good results during six months of work.

Plant of Standard Clay Products, New Glasgow, N. S.

Problems of Water Supply and Sewerage—2[*]

The Second of a Special Series of Articles—Source of Supply: Impounded Water, Lake Supplies, Rivers, Etc.

By W. Muir Edwards, M.Sc., C.E., Professor of Civil and Municipal Engineering in the University of Alberta

Source of Supply

Rainfall and Run-off.—A knowledge of the laws governing rainfall and its relation to run-off is essential to even an elementary understanding of water and sewerage problems. These factors govern the quantity delivered by any source, and materially affect the design of works for the collection and delivery of the supply and also those for the collection and final disposal of both domestic and stormwater sewage. For these purposes the annual rainfall, its distribution throughout the year and the average rate of fall, for periods of from 20 minutes to 5 or 6 hours, are required.

Of the rain which falls on any watershed, part is used up in supplying moisture to plants, etc., part is evaporated, part percolates down through the upper soil layers and replenishes the ground water supply, and the remainder forms the run-off into surface drainage channels. The first two portions are an utter loss from the standpoint of the hydraulic engineer; the latter two form the ultimate sources of both surface and ground water supplies.

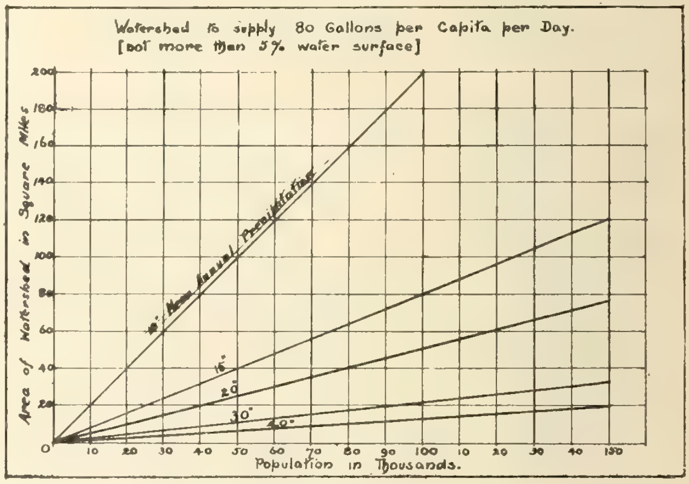
Use by plant life and loss by evaporation.—Evaporation both from water and soil surfaces depends upon the degree of dryness of the air, the temperature of the air and of the moisture in the soil and the force of the wind.

Conditions affecting evaporation from water surfaces are more uniform over large areas of country than are those affecting evaporation from soils. Thus, although data in Canada on these subjects is very meagre and we are compelled to deduce probable local conditions from statistics compiled from experiments in the United States and Great Britain, their significance should not be overlooked. Experiments at Boston, Mass., which extend over a number of years, show a monthly evaporation having a maximum of 7.5 inches, a minimum of 0.7 inches, and a mean of 3.3 inches. The yearly evaporation found during the same experiments gave a maximum of 43.6 inches, a minimum of 34.0 inches and a mean of 39.2 inches. The evaporation from snow was found to average 0.02 inches per day and that from ice 0.06 inches per day. Until there is reliable data available locally it would be advisable to allow for an annual evaporation of at least 25 inches from water surfaces in the prairie provinces, Ontario and Quebec.

Evaporation from soil surfaces is important; but there is little reliable data available. The nature of the vegetation or other soil covering and the moisture of the soil, and hence the rainfall, are factors which may vary greatly and which play an important part in determining the amount of evaporation. Experiments at Rothamsted, England, show an annual evaporation from bore soil of 16.7 inches with an average rainfall of 30.3 inches. Other experiments give an annual evaporation of 18.1 inches from soil and 4.3 inches from sand for a rainfall of 25.7 inches.

Closely related to the loss from soils by evaporation is that due to consumption by vegetation. In a table giving the consumption of water by growing crops Risler estimates that the inches per day required are as follows: meadow grass 0.13 to 0.47; wheat 0.11; potatoes .04 to .05; fir trees .02 to .04; that is, from 1 inch for forests to 6 inches for grasses per month might be considered as required in the temperate zone for six months of the year. But to distinguish between the loss due to evaporation and that due to plant growth is extremely difficult and in experimental work these losses are classed together.

Total rainfall.—In a report by Mr. Hugh T. Payne on the Rain and Snow-fall of Canada to the end of 1902 there are charts of annual precipitation which show the settled portions of the country east of Winnipeg divided into districts of approximately equal precipitation. The mean precipitation at scattered points throughout the Western Provinces is also given. From a study of this report and of the later ones of the Meterological Service it might be stated, speaking very broadly, that in British Columbia on the coast the mean annual rainfall is 120 inches, inland it is 60 inches, between the Coast Ranges and the Rockies it drops to 12 inches, rising again to 25 inches as the western slope of the Rockies is reached. In Alberta the average rainfall might be placed at from 16 to 18 inches. In Saskatchewan the mean annual rainfall for a period of ten years is given as 16.68 inches. In Manitoba the rainfall might be placed at 18 inches. In Ontario the rainfall varies from 20 inches in the northern portion to 35 inches around the lakes, in some districts rising as high as 40 inches. Along the western boundary of Quebec the rainfall is about 30 inches, and going east the rate increases to 40 inches over the greater portion of New Brunswick and Prince Edward Island and finally to 50 inches over the greater portion of Nova Scotia.



Remembering then that, if supplied, 1 to 6 inches per month may be consumed by vegetation during the growing season it might be inferred that, during this time, only a small percentage of the rainfall will be available as run-off. This percentage will, of course, be affected by slope and other factors governing the retention of the water on the watershed.

The distribution of the rainfall throughout the year is thus of importance in estimating the probable run-off from any watershed. With a rainfall of 16 to 18 inches, the majority of which occurs during the growing season, as is the case in the Prairie Provinces, we have a condition of affairs which, though very good for the farmer, is not conducive to large yields from local watersheds. On the other hand, a heavy snowfall such as occurs in Northern Ontario and in Quebec, means a much larger proportionate yield from the watershed. Should the ground be frozen and percolation not possible, there results a concentrated run-off or spring flood. Should percolation take place the ground water supply is replenished and thus the increased yield comes out gradually and maintains a more uniform flow throughout the spring and summer months. Should storage facilities be available it is the winter rather than the summer drought that tends to materially decrease the yield of any watershed.

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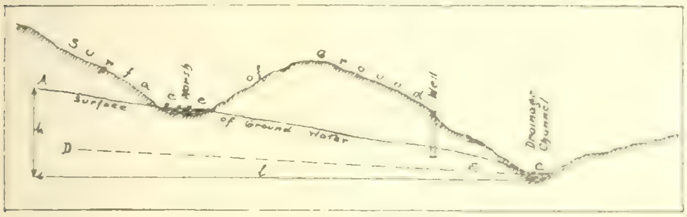
[*] The first article of this series was published in The Contract Record of February 12, 1913.

It will be evident that the estimation of yield either as a total for the year or as month by month, is a difficult matter and one not adapted to exact mathematical treatment.



Sketch No. 1

As in many other engineering problems, a correct solution depends on the good judgment of the engineer in charge and on the reasonable application by him of the general laws governing the subject.

Surface Supplies.—These are not dependent only on the surface run-off but as has been pointed out are fed by ground water also. They might be divided broadly into three classes. (1) Impounded water; (2) lakes; (3) rivers.

Impounded Water.—In cases where a given watershed is capable of sufficient annual yield and is sparsely settled, a very satisfactory supply may be obtained by impounding the run-off at a suitable location. In the majority of such supplies the soil of the watershed is of poor quality, the surface being often steep and rocky. As the whole yield for the year is retained, the surplus during conditions favorable to run-off being available during times of minimum yield, the total area of watershed required for a given daily consumption is much less than is that required in the case of a river supply. In the latter any water not used, at the moment, flows on and is lost, and thus the minimum dry weather yield must be equal to the daily consumption.

It might be interesting to arrive at the approximate area required for the supply of a given population. Mean annual precipitation and corresponding run-off have been calculated from actual measurements for a number of watersheds. The results could only be applied to similar watersheds, but an approximate computation from the results might be made. It will be noticed in the following summary of the yields from the Sudbury and Sweetwater watersheds that there is quite a close analogy between the annual rainfall in inches and the percentage of the rainfall which finally comes off as yield. The Sudbury district shows a moderately high rainfall and the Sweetwater district a low one. The period of years given includes in each case a period of minimum rainfall for the given district.

MEAN ANNUAL PRECIPITATION AND PERCENTAGE YIELD

Year	Sudbury Watershed Annual Precipitation Inches	Annual Yield Percentage of Rainfall	Year	Sweetwater Watershed Annual Precipitation Inches	Annual Yield Percentage of Rainfall
1879 ..	44.4	47.4	[illegible]	[illegible]	[illegible]
1880 ..	[illegible]	31.9	[illegible]	[illegible]	[illegible]
1881 ..	44.7	46.6	[illegible]	[illegible]	[illegible]
1882 ..	49.4	46.0	[illegible]	[illegible]	[illegible]
1883 ..	42.8	34.1	[illegible]	[illegible]	[illegible]
1884 ..	47.1	50.4	[illegible]	[illegible]	10
1885 ..	45.0	43.0	[illegible]	[illegible]	[illegible]

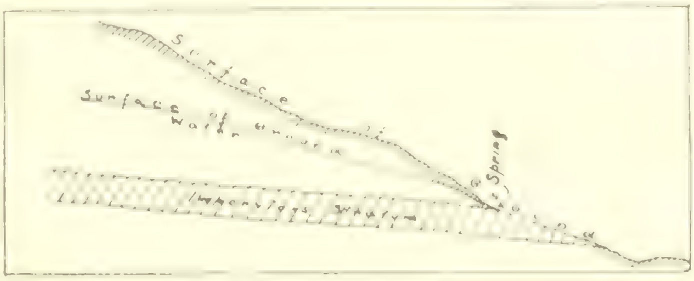
Accepting the law that the percentage yield is equal to the annual rainfall in inches, assuming an average consumption of 80 gallons per capita per day and a mean annual precipitation of 20 inches, the watershed required for a population of 100,000 would be arrived at as follows: 8,000,000 gallons per day is 2,920,000,000 gallons per year. One inch over a square mile is 2,323,000 cubic feet or 14,500,000 gallons. If the yield for a 20-inch precipitation be 20 per cent. of 20 inches or 4 inches, then the yield is 58,000,000 gallons per square mile per year. Thus we would require 2920 ÷ 58, or about 50 square miles. In a similar manner areas for any other rates of consumption, rainfall or precipitation may be calculated. These results are given in the following diagram. It might be noted that for the Prairie Provinces this law of yield would give approximately correct results but for conditions of heavier autumn and winter precipitation the calculated yields will be below the actual ones.

Lake Supplies.—A lake is simply a widening and in many cases a deepening of the drainage channel. These physical alterations introduce conditions which differentiate such a source from the drainage channel itself under normal conditions of flow. The increased cross-section of the channel means an almost total elimination of the current which is present in the drainage channel. The deepening in addition to increasing the cross-section also affects the temperature of the water.

The decrease in the direct current produces three important results. In the first place there will be a deposition of a large percentage of the matter in suspension carried along in the normal drainage channel. This means a marked purification of the water not only in so far as turbidity is concerned, but also in regard to bacterial content.

In the second place, since there is no directing current the upper layers of the water are subject to the action of the wind, and so there may be a transference of water from one point to another under no definite law, for the wind "bloweth where it listeth." It is therefore necessary to consider carefully the possibility of the transference of contaminated water from one portion of the lake to the point of supply should a favorable wind spring up.

The third phenomenon due to the decrease or practical elimination of the river currents is also affected by the question of depth. The upper layers of the water in the summer months are warmer than the lower ones, and thus a condition of stable equilibrium is maintained. These upper layers are agitated and aerated by the action of the wind to



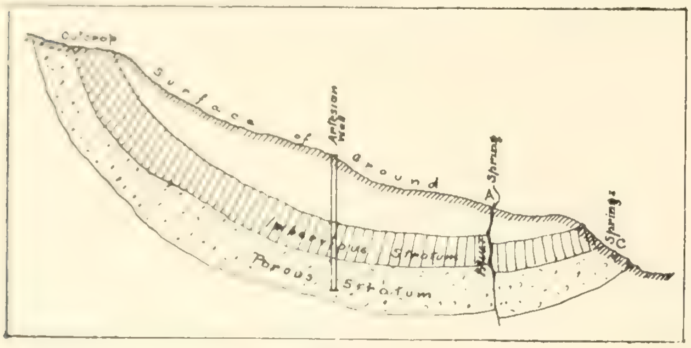
Sketch No. 2

a depth of about 20 feet. There is thus a good supply of oxygen in these upper layers, but the organic matter upon which this might act, has sunk to the bottom. In the lower layers, however, this added supply of organic matter uses up the available oxygen, and since there are no currents the water is stagnant and gradually becomes more and more charged with unoxidized organic matter. In the autumn as the surface water gets colder a state of unstable equilibrium [illegible] currents [illegible] carrying the now lighter deep water to the surface. With the sudden supply of oxygen to this organically-charged water a reaction takes place supplying abundant food for the infusoria and diatoms. These multiply very fast, their activities producing an oil which gives a "fishy" taste to the water. This [illegible] generally speaking a lake is a more satisfactory source of supply than the drainage channel upon which it is located.

Rivers.—There are certain problems which are more or less common to all river supplies. They might be enumerated as (1) turbidity, (2) contamination, (3) flood flow, (4) dry weather flow.

Surface drainage channels and watersheds are subject to more or less scouring. This may take place only at the time of the spring freshets and may be of short duration. In other cases the river may flow over an easily scoured geological formation and show an excess of turbidity after every heavy rain. Practically all surface sources are open to contamination, but of the three the river source is the one most exposed. Deposits on and in the banks may be washed out, sewage and other contaminating waste may be run directly in, and on navigable streams there is contamination originating in the steamers plying upon its surface. The compulsory treatment of raw sewage does not eliminate the entire danger and it might be stated as an axiom that sooner or later a public supply from a river source should be purified.

The occurrence of flood water and its intensity are important chiefly from the standpoint of the collecting works, The intake must be designed to withstand the treatment it may receive under such conditions. Aside from the increased turbidity, however, high water does not present any great difficulties should the power house be properly designed. The difference in elevation between the water level at this time and that at low water must be provided for in such design.



Sketch No. 3

Low water is in many supplies the period of greatest anxiety. Due to concentration caused by less volume contamination may be a much greater danger. The actual rate of flow from a watershed may also fall very low during dry weather conditions and difficulty be experienced in obtaining the quantity required. A careful study of all available statistics, a careful classifying of the contradictory evidence obtained from old residents and finally a liberal factor of safety should be used in selecting as a source a river whose dry-weather flow is known to be fairly low. In this connection, however, it should always be remembered that the problem is very different from that of a power supply. For instance, the maximum use of water by a municipality of 100,000 persons would not be more than 35 cubic feet per second. To express this in a manner more easily grasped it might be stated to be not more than the quantity delivered by a stream 6 feet wide, 2 feet in average depth and flowing at the rate of 2 miles per hour. Such a stream with a 25-foot fall would deliver approximately 100 horse power.

Ground Water Supplies.—The causes governing the storage, movement and outflow of ground water are not as apparent as are those affecting surface water, and consequently are not as well understood. As has been pointed out, a certain proportion of the rainfall percolates through the upper soil layers and replenishes the underground water. The amount of this percolating water depends on the rainfall, on the soil covering and on the nature of the soil itself.

The action of underground waters is governed by the ordinary hydraulic laws and its surface is determined by them. Since the frictional resistance to flow through the interstices of the soil is high, there must be a much steeper slope in the surface of the underground water than is required in the case of surface waters. Should an outlet occur as is offered when a surface drainage channel is at a sufficient depth to tap the underground supply, then the rate of flow to this point will depend on the head causing it and the nature of the formation through which the flow takes place.

In the above sketch the ground water is shown as slowly finding its way to a drainage channel. The rate of its flow will depend on the rates of h to l and on the nature of the formation. The occurrence of a marsh and the depth to which a well would have to be sunk to tap such an underground source is also shown. Should the rainfall and the resulting percolation not replenish the ground water in sufficient quantities to maintain the flow which occurs with a slope of h/l, then the slope would adjust itself to the drop required by the lesser velocity. Thus a condition of flow represented by the dotted line D E C might occur. In this case the marsh would dry up entirely and the well would have to be sunk below E to maintain its supply.

Some water supplies are obtained from what is really an underground lake. An old river bottom which has gradually been filled up with drift often forms such a source. The voids are filled by the underground water and this may be drawn off by wells sunk at suitable points. Such a supply is, of course, dependent on the local rainfall.

Springs and Artesian Wells.—Underground water may occur as really a surface supply in the sense that the point of development is at the surface. These occurrences are known as springs, should the outlet be a natural one, and as artesian wells should it be necessary to provide an artificial channel through which the underground water rises.

A spring is probably the most popular source of water supply. This is very natural as it has all the purity and coolness of underground water and the accessibility of a surface supply. There is, however, sometimes a belief that a spring is immune from the variations met with in a surface source and that no matter what may happen to the creek in dry weather the spring will continue to flourish. This is by no means true, and since the spring also is dependent on the rainfall, its actions under continued dry-weather conditions should be carefully investigated before it is relied upon as a permanent source of supply. In such an investigation and in the design of works for the development of springs a knowledge of the causes producing them is essential. Their occurrence might be classed under three heads, each of which is illustrated in the following sketches.

The first class of springs is that caused simply by the fact that the level of the ground water is such that there is an overflow along the bank of a drainage channel. Thus, referring to previous sketch No. 1, should the percolation become sufficiently great the surface of the ground water might rise to such an elevation that outflows would occur along the bank of the drainage channel. Such springs would likely be of a periodic nature breaking out during wet weather and drying up at times of minimum precipitation.

The second class of springs is illustrated in sketch No. 2. Here an impervious inclined stratum intercepts all the percolating water and delivers this collected water along the edge of its outcrop.

Local conditions such as a ravine running into the hillside, may localize the outflow and so a series of springs may take place. Conditions of outlet materially affect the flow and thus by cleaning out a spring more water may be induced to seek its outlet there and the yield of the spring be increased.

The third class of springs is that caused by the sealing of an inclined porous stratum by an overlying impervious one, as shown in sketch 3.

The water percolating into the porous stratum at its outcrop is retained in this stratum under pressure as the stratum dips and should a break in the impervious covering occur, as shown at A, an outflow or spring will result. Should no such natural break occur, but a bore hole be driven through the impervious stratum, as at B, an artesian well is formed. Should the porous stratum outcrop at a lower elevation, as shown at C, springs would occur along the edge of this outcrop. Such a spring might deliver water long after local surface drainage channels had dried up, as it has the stored water in the porous stratum to draw upon. The lower outcrop may be hundreds of miles from the upper one and the flow of the spring be quite independent of the variations in local precipitation.

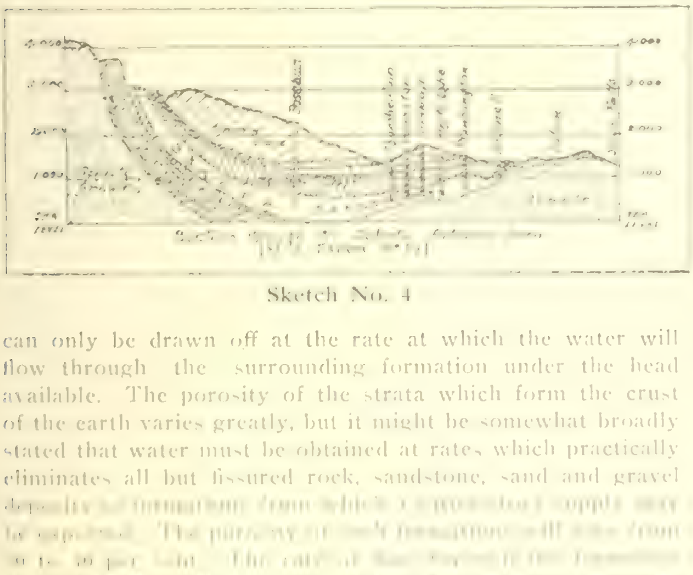
The term "artesian" really means flowing water, and should rightly be applied only to such occurrences. It has come to be applied, however, also to water occurring in deep strata overlaid by impervious ones. In some cases the pressure in the lower stratum is not sufficient to cause a flowing well although the water may rise almost to the surface.

A geological cross-section of Dakota artesian area is shown in sketch 4. The principal source of supply is the Dakota sandstone, whose occurrence may be seen in the sketch.

The outcrop of this formation occurs at an elevation about 3,000 feet above sea level. It then bends steeply below the impervious Benton clays, rises again and finally outcrops along the Sioux River at an elevation of about 1,000. The pressure in the wells that tap this area is quite high, going up to 150 lbs. per sq. in. in some instances.

The quantity supplied by underground sources varies, the probable yield being difficult to estimate. The supply can only be drawn off at the rate at which the water will flow through the surrounding formation under the head available. The porosity of the strata which form the crust of the earth varies greatly, but it might be somewhat broadly stated that water must be obtained at rates which practically eliminates all but fissured rock, sandstone, sand and gravel deposits as formations from which a dependable supply may be expected. The porosity of such formations will vary from [illegible] per cent. The rate of flow through the formation depends both on the porosity and on the [illegible] slope of [illegible] velocity might be said to vary from .03 feet per day for a sandstone to [illegible]

[illegible] consider the flow through a gravel bed (effective size of grain 0.5 mm. porosity of deposit 30 per cent.) half a mile wide, 30 feet deep and sloping 10 feet per mile. The velocity of flow through the voids in the deposit would be about [illegible] feet per day. Thus the total flow across the deposit would be 30 x 2640 x .30 x 2 cu. ft. per day, or about 300,000 gals per day.



Sketch No. 4

It is extremely difficult to estimate the probable yield of a single well. The best plan is to pump until a condition of equilibrium is established between the water flowing in and that pumped out. With this information and additional data as to ground water slope obtained by comparing the level of the water in the well being pumped and that in a well some distance away, fairly close estimates can be made of the yield and of the effect of increasing the number of wells drawing their supply from the same formation. After the maximum yield of a cross-section has been obtained an increase in the number of wells will only lessen the supply from those already in operation.

Ground water supplies are pure and if not too hard are very satisfactory, but the question of quantity should be carefully considered. Although it is true that no very definite results can be obtained with the information available at least an approximate estimate is possible, and this in many cases will stamp the promised yields from such a source as absolutely improbable if not altogether impossible.

Building Work at Regina

OVER twelve million dollars' worth of building is already in prospect in Regina, Sask. There promise to be four buildings erected to cost at least $1,000,000 each. These are the Presbyterian College to cost $1,000,000; the nine-storey hotel of the Grand Trunk Pacific Railway to cost at least $1,000,000; a flour mill, grain elevator and drying plant to cost $1,000,000, and a departmental store to be erected by C. W. Sherwood.

Added to the list of educational institutions there will be the Presbyterian College; an Anglican Ladies' College; a Normal School and a girl's hostel in connection with the Anglican College.

The hotel to be erected by the Grand Trunk Pacific Railway company will be in keeping with the hotels that have been erected at various points throughout the Dominion by the company. In Western Canada, the only two points, outside of Winnipeg, where this railway company proposes to erect hotels are Regina and Edmonton. The Regina City Council have already entered into an agreement with the railway officials for the erection of the hotel, the cost of which is stipulated to be at least $1,000,000 and construction on it will be commenced early in the spring in an endeavour to have the hotel in service at the earliest possible time. The hotel is patterned after the Chateau Laurier at Ottawa.

Messrs. McCallum, Hill & Company originally intended to erect an eight-storey building, but now that the city has decided not to allow the erection of buildings to a greater height than ten storeys, they have decided to go the limit. The steel framework of the building is being erected at the present time.

Notwithstanding a greatly increased volume of business, the profits of the Nova Scotia Steel & Coal Company for the year were smaller by $18,783 than in 1911. The figures were $1,000,609 in 1912, as compared with $1,019,393 in the previous year and $1,140,504 in 1910. After meeting interest on bonds, bank loans and debenture stock dividend, but before allowances for reserve funds, etc., there was a balance out of the year's profits equal to 7.96 on the common stock. This compared with a corresponding percentage on the same basis of calculation of 9.35 per cent., in 1911. The president states that for nine months the company were affected by the dumping of iron and steel products from the United States, and prices of iron ore were also low. As to the outlook for 1913, it is stated to be distinctly more favorable. Earnings should be larger from iron ore sales, prices will be higher for other products, and the new plant should also make a considerable increase in the earning power of the company. The Eastern Car Company, organized as a subsidiary, also promises to add considerably to the present company's revenue in the future. The company will be in operation by August.

A General View of the Auburn Power Company's generating plant, showing l

The Auburn Power Company's I

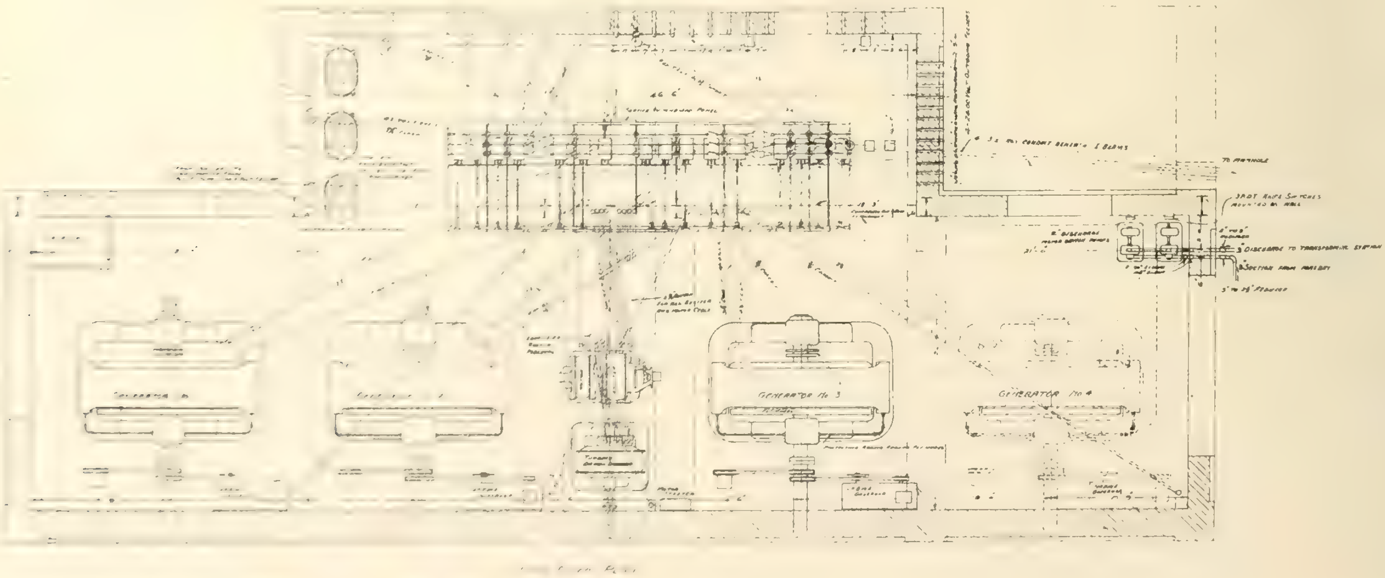
Features of an Interesting Installation—Details of Provide Total Discharge Capacity of 26,000 ft. per

In the early history of power development in Peterborough, a woollen mills company obtained water rights on the Otonabee river, from the government, at a point which at that time was situated north and just outside of the city limits. A few years later a timber dam with stone piers was built at this point and the power obtained was utilized for driving a woollen mill on the east side of the river and also to generate power which was supplied to the city of Peterborough. Later, the power plant was bought out by the Auburn Power Company who operated for a number of years, utilizing water from the old Auburn woollen mill dam. About three years ago the Auburn Power Company was purchased by the Electric Power Company, including the water rights of the Auburn Woollen Mills Company and a larger development was planned to economically utilize the minimum flow of the river at that point. In October, 1910, work was commenced on an entirely new and up-to-date plant which was completed and placed in operation about a year ago.

The hydraulic features of the development comprise the following: (a) main dam and intake; (b) head canal; (c) power house; (d) tail race.

Main Dam and Intake

The main dam is located opposite the Auburn woollen mills and about 1,200 feet north of the power house. It is a concrete structure consisting of piers and stop log sluices. The piers are each 6 feet thick and the sluices each 20 feet wide, with the exception of the log slide which is 9 feet on a slope of three horizontal to one vertical, with two piers, each 4 feet thick. The maximum height of the dam is 24 feet and the total length from east to west abutment is 452 feet including the intake to the head canal, which occupies a total width of 99 ft. 6 ins. at the west shore. The dam is con-



Showing main floor plan of Auburn Power Company's development at Peterborough

pillway, sluice gate, power house, tail race and transformer house in background

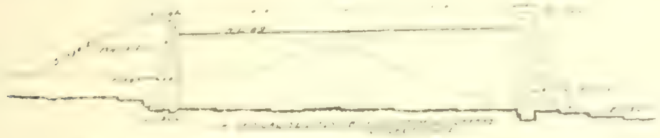
elopment on the Otonabee River

nd Construction—Main Dam and Intake—Sluices Head Canal and Tail Race—Hydraulic Equipment

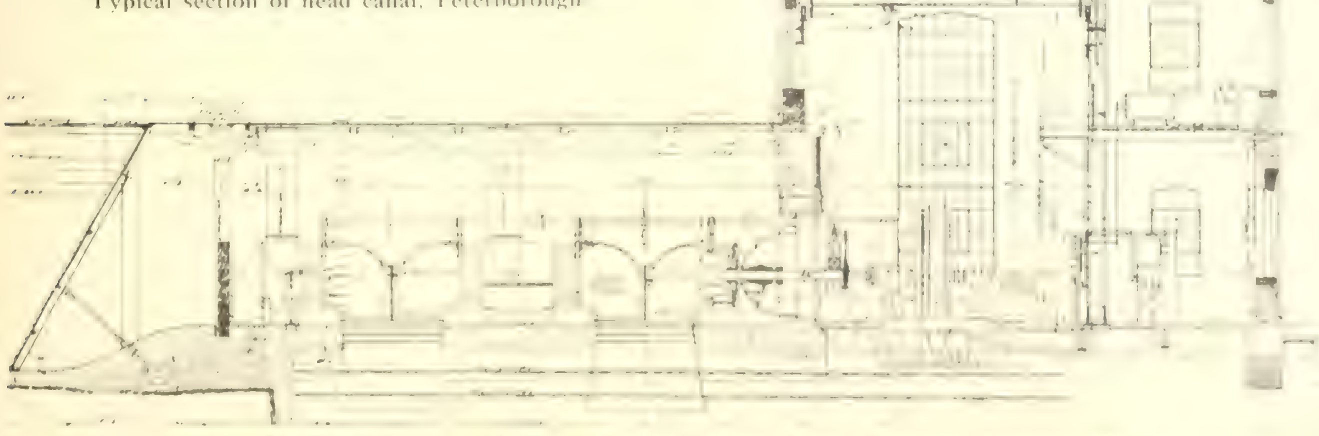
structed on solid limestone foundations but is designed to resist upward pressure, if water should percolate between the base and the foundations—or through the seams in the rock below. The piers are extended to the full height of the dam to provide for the construction of a street railway crossing at some time in the future, see figure. Each sluice has a depth of 10 feet below normal head water level, and thus provides a total discharging capacity of 26,000 cubic feet per second. The area of the water shed above the dam is 2,821 square miles, and the flow from this area is well regulated by the works of the Trent Canal. The area of the storage pond is approximately 20 acres. At the west end of the dam is located the intake, which consists of four stop-log openings each 20 feet wide and 10 feet deep, and separated from one another by piers 4 ft. 6 ins. thick. The total width of the platform for operating the stop logs is 14 feet. The stop logs for both intake and dam are handled by means of chain winches which can be pushed along on rails provided for this purpose.

Head Canal

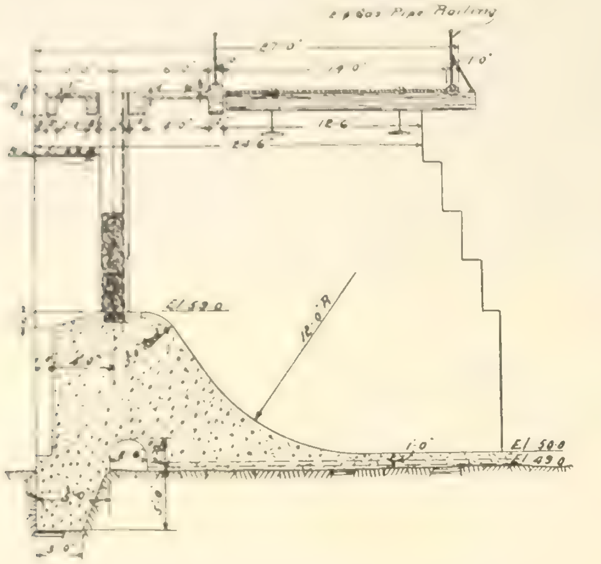
The total length of the head canal is 1,200 feet, and it lies parallel to the river between the dam and the power house. The excavation was made up of approximately the following qualities: solid rock, 1,453 cubic yards; loose rock, 2,270 cubic yards; common, 8,399 cubic yards. The section of the canal for some 400 feet below the head works has a solid rock bottom 74 feet wide with a concrete wall on either side. The section between 400 feet and 970 feet from the head works was common and loose and solid rock excavation and is 86 feet wide at the top. Part of this section has a solid rock bottom and the remainder is covered with 6 inches of



Typical section of head canal, Peterborough



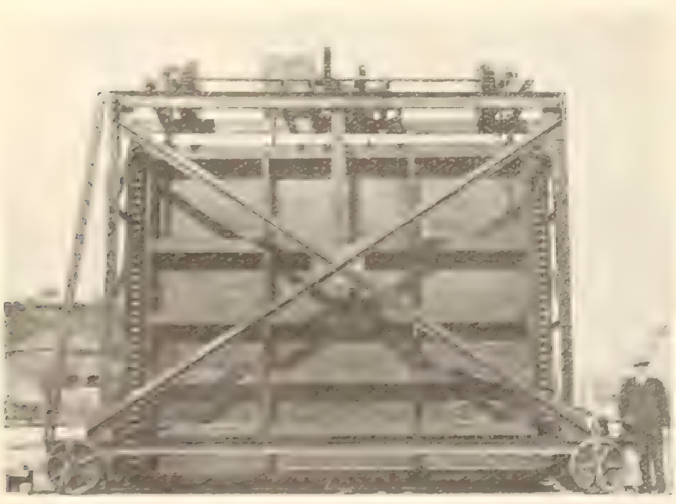
Sectional plan through power house Auburn Power Company, Peterborough [illegible] in accompanying figure. The [illegible] also covered with reinforced concrete 9 inches thick. The 230 foot section im[illegible] the power house is [illegible] feet wide, the bottom being solid rock with concrete walls on either side. In the head race wall at the face of the racks is situated an ice run 20 feet wide, see general view, the level of which is regulated by light 3 in. x 12 in. planks. The racks are 19 ft. 7 9-16 ins. long and consist of flat steel bars 3½ in. x 5-16 in. bolted together in sections 3 ins. wide with 1¾ in. spaces between bars. The upper section of the racks is of wood a special design calculated to minimize ice troubles.



Section through spillway of main dam

A Travelling Sluice Gate

There are five wheel pits with a 3-foot wall between them. Four of these are designed for power units and in the fifth, situated in the centre of the structure, the exciter turbine unit is located. The main wheel pits are 40 feet long, 16 feet wide and 14 feet deep giving a net area at the entrance of each wheel pit of 224 square feet. The water may be cut off from the wheel pits by means of 12 in. x 12 in. stop logs, but as this operation is rather slow, and difficulty is always found in getting the stop-logs sufficiently water-tight to empty the wheel pits for repair or examination of the turbine gates or runners, a specially designed travelling sluice gate has been provided by means of which the water can be stopped off from any wheel pit in a few minutes. This gate is 15 ft. 3⅝ ins. wide and 14 ft. 3 ins. high, and is constructed of riveted boiler plate carried by a travelling gantry constructed of structural steel and mounted on four cast iron wheels 2 feet in diameter, the wheel base being 9 ft. 8 ins. and the rails a standard width 4 ft. 8½ ins. The gate itself is fitted with circulating rollers at each side to run in the concrete stop-log gains. With this arrangement it can be lifted or lowered under a full head of water with the turbine gates wide open. Leakage when the gate is closed is reduced to a minimum by means of adjustable skin side-bars which serve as guides and are set into place after the gate is closed. The gate is moved along the rails by means of a hand gear, but is arranged to be raised or lowered either electrically or by hand, and is fitted with a self-sustaining brake. It is capable of being lifted or lowered by means of the motor in 2¼ minutes against quick running water passing through the opening under the maximum head available and under the same conditions may be lowered by hand in four minutes, or lifted by hand in sixty minutes.



Emergency sluice gate, Peterborough

The Power House

The power house substructure is composed entirely of reinforced concrete, 3,439 cubic yards being required for its construction. The inside dimensions of the power house are 88 ft. x 21 ft. 6 in. x 32 ft., with a bay in the centre of lower side of the structure 14 ft. x 46 ft. 6 ins. The roof is covered with red tile which in addition to its durable qualities adds considerably to the artistic appearance of the building.

The Tail Race

The discharge openings from the wheel pits are 16 ft. wide with 3-foot walls between them and the water may be cut off from the wheel pits by means of 12 in. x 12 in. stop logs. The tail race is approximately 250 feet long and is a rock excavation. The tail race passes under the G. T. Railway bridge just before it joins the river.

Hydraulic Equipment

There are at present installed three four runner Sampson horizontal turbine units with a maximum capacity of 950 h.p. at 18 feet head and 150 r.p.m. having a maximum efficiency at 700 h.p. The guaranteed efficiency is 80 per cent. at ⅞ gate, 82½ per cent. at ¾ gate, 82½ per cent. at ½ gate, and 73 per cent. for ¼ gate. After the turbines were installed they were tested for capacity at normal head and efficiency at various gate openings. In making these tests, a suitable load was obtained by the use of a 6,600 volt water rheostat located in the tail race and the water which passed through the turbine was measured at the stop log gains in the tail race by means of a Price current meter.

The turbine runners consist of steel plates, the gates and guides of cast iron, the draught tube ring of cast iron, and the draught tube of steel plate. The bearings are lignum vitae, and babbit ring oiled type. Each unit has two cylindrical inspection tubes with a step ladder fastened to the inside to permit of the bearings being easily inspected.

The exciter turbine consists of two 26-in. Sampson runners mounted on a horizontal shaft and is capable of delivering 170 h.p. at the generator coupling at full gate when operating under 18 feet head and at normal speed of 275 r.p.m. The runaway speed of the turbine is 425 r.p.m., and the efficiency at full gate 80 per cent.; at ¾ to ⅞ gate approximately 82 per cent.

The construction works in connection with installing the plant was done by the Midland Construction Company. The sub-contractors in the general works were Clarke & Monds, Trenton, and on the structural steel work Mackinnon, Holmes & Company, Sherbrooke, Que. The work was done according to the designs and under the supervision of Messrs. Smith, Kerry & Chace, consulting and operating engineers of the Electric Power Company.

The Good Roads Convention at Toronto

Progressive Movement Receives Further Impetus at the Eleventh Annual Meeting of The Ontario Good Educational Association

THE Eleventh Annual Convention of the Ontario Roads Educational Association was held last week at Exhibition Park, Toronto, February 26th-28th. In conjunction with the convention there was an excellent exhibit of machinery and materials used in road construction.

At the opening session of the meeting the delegates were welcomed by Mayor Hocken, who expressed himself strongly in favor of the movement and declared that the Government should increase the present grant of one-third the cost of construction to one-half. He suggested that taxation for road improvements should be carried out in the province on the plan adopted by Toronto for civic improvements.

Sir Edmund Walker on Road Development

Sir Edmund Walker traced the history of road development from its infancy. He declared that transportation was the heart of civilization. Canada, he said, had the largest railway mileage in proportion to its population of any country in the world, but from the point of view of area its good roads were small. Rome had recognized the value of highways more than two thousand years ago, and since then the history of the various nations showed that as their greatness increased so did the condition of their highways.

In the opinion of Sir Edmund, one of the greatest foes of the high cost of living was the good road. By bettering the condition of the highways the farmer was given every facility to market his produce in the cities direct. In this way not only would the farmer be benefited economically, but also the residents of the cities would be able to secure their foods at a reduced cost. Sir Edmund also spoke against the statute system of road work, and declared that it must be abolished if quick and lasting results were to be obtained. He was in favor of the Government paying for the maintenance of the highways.

President T. L. Kennedy was of the opinion that to solve the problem of road improvement it would be necessary to pay especial attention to the requirements of the different localities. Every municipality would have to be visited and a direct understanding arrived at. In this way it would be possible to give every county good roads. He was in favor of the motorist contributing towards the maintenance of the roads. Owing to the expected new legislation in regard to good roads, the president did not believe that there would be great activity in road building this year. The Government, he believed, should devote more money to the work of road building than they have done, and, while praising their construction work on roads throughout the province, he declared that with changed conditions it was necessary to have new laws made to meet new requirements.

Tax the Railroads

One of the features of the meeting on February 27th was a discussion regarding the proposed higher taxation of railroads in the interests of road building and maintenance throughout Ontario. The following resolution was introduced by Mr. J. A. Senecal, of Prescott

"Whereas the burden of taxation should be fairly and equitably distributed in the province the time has come when railway companies should bear a fair share of the cost of the administration of the affairs of the country. Be it thereby resolved that this convention place itself on record in favor of higher railway taxation, and that such revenue be placed at the disposal of counties or townships that would adopt the Good Roads system."

Mr. Senecal advanced the following reasons for an increase of railway taxation: That in Canada, the taxation averaged $70 per mill, as against $1,000 per mile in England, and in the U.S.A. there were various rates of taxation in the various States, which ranged from $148 per mile in the barren state of Arizona to $1,928 a mile in the state of New Jersey.

He compared Ontario to Michigan, which state was perhaps the most like Ontario in its conditions than any other state of the union, and said, "In that state railroads pay $400 per mile in taxes; In Ontario the railroads pay $100.

"The total revenue thus obtained in the state of Michigan was $4.436,201, compared with $831,200 in Ontario, which province had only a little smaller mileage of railroads than Michigan," he said.

He gave figures to prove that the earning capacity of Canadian railroads were equal to and in some cases larger than in the States. "The C. P. R. earns $7,380 per mile per annum in Canada, as against $5,500 in the United States." Mr. Senecal stated vigorously.

Mr. W. A. McLean, Chief Engineer of Highways for Ontario

An important announcement was made by Dr. Reaume, Minister of Public Works for Ontario, who spoke of a generous policy of road building on the part of the Provincial Government. Dr. Reaume said: "One of the questions of the highest importance is the maintenance of our roads. It costs money to build roads and a great deal more, together with attention, after they have been built. To-day we are on the verge of having our dreams realized, and it is the intention of the government to investigate the kinds of material suitable for roads in various parts of the province. We realize that the grant of $5,000,000 is small and that a great deal more than that will be required."

Mr. W. A. McLean, Chief Engineer of Highways for Ontario, read an instructive paper entitled, "County Road Organization and Construction," in which he urged the need for better organization in road-building work and the employment of skilled supervisors.

Dr. L. I. Hewes, Engineer-in-Charge of the Maintenance [illegible] his experiences in the field and asserted that the one important thing lacking in road undertakings was business management. Altogether inadequate attention was paid to the subject of maintenance.

That the Government should undertake to construct highways [illegible] for this purpose, paid by the tax [illegible] to H. H. [illegible] county road superintendent of Frontenac. He claimed that it was not fair to tax the farmers for the roads when they were used as frequently by tourists and residents in towns and cities. In his opinion, the life of a road lay in its drains, and he advocated that special attention should be given to laying them when the [illegible] opened.

[illegible] papers presented at the meeting cover a wide range of practical topics and include the following—not mentioned above but which we hope to reproduce in whole or in abstract in early numbers of the Contract Record: Town and City Streets, Mr. G. G. Powell; Steel Bridges, Mr. C. R. Young, Consulting Engineer, Toronto; Concrete Bridges, Mr. Chas. Talbot, London, Ont., County Engineer of Middlesex; Stone and Gravel Roads, Mr. E. R. Blackwell, County Engineer of Leeds and Grenville.

The Exhibits

The exhibits of road machinery and materials were particularly noteworthy. One of the largest exhibitors was the Ontario Government, whose display covered practically every phase of road work. Photographs of various roads were shown and the different systems used in paving work were illustrated. The other exhibitors included: Wettlaufer Brothers, Ontario Bridge Company, Sawyer Massey Company, Paterson Manufacturing Company, W. N. McEachren & Sons, Buffalo Pitts Company, Rocmac Roads, Limited, Stratford Pipe Company, Canada Cement Company, Ontario Rock Company, United States Steel Products, Hugh Cameron and Company, Abram Cement Tool Company.

National Gathering of Builders at Calgary

Seventh Annual Convention of The Canadian National Association of Builders' Exchanges—Eastern and Western Districts Organized

THE 7th annual convention of the Canadian National Association of Builders' Exchanges was held at Calgary, February 18-20. There were about sixty delegates in attendance at the opening session. On the opening day an address of welcome was delivered by His Worship Mayor Sinnott. In the absence of the President, R. A. Brocklebank, of the Calgary Exchange, the convention was called to order by Vice-President James Marr. Response was made by Mr. Geo. Gander, of Toronto, vice-president of the national association.

In his annual address, the President, Mr. J. W. Morley, referred to the growth of the association and expressed his gratification at the fact that so many important centres were represented at the convention. Montreal and Quebec were disappointing in this respect. The resignation of Mr. J. H. Lauer, Montreal, secretary-treasurer, was submitted and Mr. P. L. Fraser, of Toronto, was appointed to the position pro tem.

The most important business transacted at the various sessions was the reorganization of the national body into eastern and western associations, closely affiliated. The western organization will be made up of the exchanges of Alberta, Manitoba, Saskatchewan and British Columbia, while the eastern organization will comprise the provinces of east Manitoba. The western division will meet in Edmonton next year, and a meeting place will be selected later for the eastern branch.

Officers of the two organizations were elected as follows: Western district:—president, Mr. W. J. Davidson, Winnipeg; 1st vice-president, Mr. G. Sylvester, Calgary; 2nd vice-president, Mr. W. A. Wilson, Regina; secretary-treasurer, Mr. A. M. Rose, Winnipeg. Eastern district:—president, Mr. Geo. Gander, Toronto; 1st vice-president, Mr. L. A. Martyn, London; 2nd vice-president, Mr. Jas. Ballantyne, Montreal; secretary-treasurer, Mr. P. L. Fraser, Toronto. The foregoing officials from both the eastern and western sections will form the executive body and directing organization for the reorganized national association. They will meet together at a time and place to be decided later at call. They will select their own secretary, who will preferably be an Ottawa man in order that he may be on the ground to watch legislation affecting the interests of the organization.

The Association appointed a special committee to examine into the causes of the labor shortage and to co-operate with various associations in bringing workers from Great Britain. It was pointed out that this would probably arouse opposition on the part of the unions, but the Association is prepared to combat this element. Other resolutions passed included a number of the following purport:

Recommending the enactment of a uniform building code in the four western provinces as of immense benefit to builders and the public.

Petitioning all exchanges in the association to take particular care to see that all transient builders and contractors were placed on the assessment rolls of the cities where they were doing work in order that they might bear their fair share of municipal taxation.

The Retiring President, Mr. J. W. Morley, Winnipeg

Requesting architects to furnish contractors, outside of the ordinary 1/8 inch scale drawing, all necessary scale drawings to exemplify work to be tendered on so that contractors may tender intelligently.

Resolutions also were adopted specilly thanking the Calgary exchange for the entertainment afforded the delegates, and also thanking the press and trade journals for the publicity given the gathering.

Mr. J. W. Morley, of Winnipeg, the retiring president, was unanimously elected an honorary life president of the national association.

A number of reports were presented on behalf of various sections of the Association. Mr. Geo. Gander reported for the Ontario Provincial Association. Their active efforts, he said, were being directed towards obtaining a better Workmen's Compensation Act. During the past year the Toronto Exchange had had eighty-five new members. Any trouble experienced had been from shortage of materials.

Mr. W. A. Wilson, Regina
Second Vice-President, Western District

Mr. C. R. Frost, of Edmonton, reported as follows on behalf of the Alberta Provincial Association:

"The principal questions considered at the second annual convention held at Lethbridge, in March, 1912, were a Uniform Contract Form for Alberta, Amendments to the Mechanics' Lien Act and Liability Insurance, and I am pleased to state that our delegates, together with a delegation from the Alberta Association of Architects, were successful in drafting up a splendid uniform contract for Alberta, which was adopted by both organizations.

"During the interval since the convention held in Lethbridge, the various affiliated exchanges have been considering amendments to the Mechanics' Lien and Workmen's Compensation Acts. During the early part of 1912, the Calgary exchange had certain amendments drafted to the Mechanics' Lien and presented to the provincial cabinet, but I regret to state that, to my knowledge, no action was taken by the government toward the amending of the act. But we propose this session of the legislature, to present amendments which will have the endorsation and support of all the Alberta exchanges.

"The Edmonton Builders' Exchange had amendments drafted to the Workmen's Compensation Act. These were now reads, against permanent disability. The risk is less hazardous where the injury results in death than if it were permanent disability, for such an injury leaves the employer liable for an amount not exceeding $10 a week as long as the employee shall live, whereas if the injury result in death the presented to the provincial government in 1910, 1911, and the first part of 1912, but these have in every case met with a fate similar to that of the Mechanics' Lien. In connection with the Workmen's Compensation Act, it is impossible for an employer to fully protect himself by insurance, as the Act liability does not exceed $1,800. According to the act the former can be demanded, and no insurance is available to cover such an indefinite liability. Therefore, we hope to see the provincial government at this session take, at our solicitation, such measures as will be necessary toward the amendment of this act, and by so legislating or amending this unjust clause of the act, together with the other clauses, the same as those already drafted, the employers will then be enabled to operate with a knowledge that they are being protected by so doing; whereas, at the present time, the liability is without limitations.

"The Alberta Association of Builders' Exchanges, is being held in Edmonton Monday and Tuesday, February 24 and 25, when we hope to see the delegates in attendance unanimously endorse each and every amendment to these acts.

"We also propose to consider the adoption of a 'uniform sub-contract form' for Alberta, and I am well satisfied we shall be successful in this regard. The sub-contractors throughout the province have long felt the need of a good contract, and ere the Canadian National Association of Builders' Exchanges assemble in convention in 1914, I believe we shall be able to report that such a contract form was adopted at the convention held in Edmonton in 1913.

Mr. W. J. Davidson, president of the Winnipeg association, reported for Manitoba. He said that Winnipeg did $21,000,000 worth of building last year, and 95 per cent. of that work was done by Winnipeg builders. He spoke of building up exchanges, and said he thought care should be exercised to keep out undesirable people such as liability insurance men, etc., and confine membership to contractors and supply men.

He spoke of the effort to procure a better compensation act, and said that upon the suggestion of the government a committee composed of delegates from the manufacturers, builders' exchanges, and labor unions was engaged in preparing a draft of a bill which it was hoped would be satisfactory to all. He spoke of the tendency to discourage the development of building mechanics, and illustrated the difficulty of young men wishing to learn such trades in getting

Mr. James Ballantyne, Montreal
Second Vice-President, Eastern District

the unions. He thought [illegible] unless more masons and bricklayers were developed, the builders would be under the domination of the unions. The Winnipeg [illegible] [illegible] of such labour, he thought [illegible] [illegible].

The speaker said the Winnipeg [illegible] looking [illegible]

[illegible] much [illegible] upon the making of agreements with men as it had been found they only lived up to them until they would be benefited by breaking them. It was now contemplated that the builders should make an agreement among themselves and reinforce it with a bond to insure living up to [illegible] and pay no attention to agreements with the men.

The speaker referred to the large number of members of the Winnipeg exchange who are in the city council of Winnipeg, and said the city had also come to the association for a mayor. He thought that pretty good evidence of the quality of men in the Winnipeg exchange.

Mr. [illegible] Powell reported for Saskatchewan. Among other things, he referred to the creditable action of the labor unions in not demanding higher wages after the big cyclone a year ago, but said that later they demanded a rise from 67½ cents an hour to 75, and eventually a compromise was arrived at of 70 cents.

Mr. P. L. Fraser, Toronto, Secretary Eastern District

Mr. George A. Crain, of Ottawa, reported for the Ottawa exchange, after which the report of the secretary-treasurer was read by P. L. Fraser, secretary pro tem. The financial statement showed a balance of $44 in the bank, with no outstanding obligations.

Architectural students at McGill have entered for intercollegiate prizes, for which students from Harvard, Cornell, Pennsylvania, Syracuse and Massachusetts are competing. The competition calls for designs for a college library, specifications of which have been prepared by a well-known architect. The McGill students who have entered for the prize (ninety dollars for the best drawing submitted, and sixty dollars for the second) are Mr. W. C. Hyde, Mr. O. Barwick, Mr. W .D. McLennan, Mr. F. Lawson, Mr. A. Harrison and Mr. F. H. Wilkes.

The work of enlarging and remodelling the Chateau Frontenac will be commenced very shortly. It is expected that the new work, which will add four hundred rooms to the present accommodation of the Chateau, making it one of the largest and finest hotels on the continent, will be ready for the spring of 1914.

If the government does not continue to give the present amount of protection to the cement industry or decides to re-enact the duty remission of fifty per cent. enforced from June 1 to October 31 last, it will act in the face of a warning from the Canada Cement Company, the Canadian merger, that advantage would be taken of conditions to obtain the highest price possible for their cement in Canada during periods of restricted supply, so that later they will be able, out of the accumulated reserve, to make importations from the States at slaughter prices.

Clay Products Convention at Calgary

THE first annual convention of the Alberta Clay Products Manufacturers' Association was held recently at Calgary. One of the important things decided at the meeting was a standard size for brick. This was determined at 8 x 3¾ x 2½ for common brick and 8¼ x 4 x 2½ for face brick. It is hoped that these sizes will quickly become completely standardized in the province of Alberta. The closing event of the convention was a banquet given at the Rathskeller Hotel. The first president of the association is Mr. W. J. Tregillus, of the Tregillus Clay Products Company.

The delegates to the convention and the works they represented were as follows:

F. Vickerson, E. H. Wilson and D. C. Gourley, of the Lacombe Brick, Tile and Cement Company of Lacombe; P. Collins, Colins Brick Plant, Cochrane; Robert Spencer and J. P. Henry, Acme Brick Company, of Edmonton; Thos. B. McClellan of the Fort Saskatchewan Brick Works; Lew Thorne, of the Keystone Cement Company's brick plant, Blairmore; W. J. Tregillus, W. G. Worcester, E. C. Britton, John C. Paterson, C. F. Beckwith and Karl Heilman, of the Tregillus Clay Products Company, of Calgary; Mark Drumm, of the Blossomwood Clay Products Company, of Frank; D. H. M. Little, of the E. H. Crandall Company, of Calgary; Pollard Bros., of Edmonton; John O. Williams, of the Camrose Brick Company, Camrose; D. H. Kremer, of the Innisfail Brick Works, Innisfail; J. E. Shields, of Brick Supplies, Limited, Calgary; F. E. Piper and E. R. Hill, of the Piper Brick Company, Red Deer; A. J. Bartle, of the Sandstone Brick and Sewer Pipe Company, of Sandstone and Calgary.

Mr. W J. Tregillus, President
Alberta Clay Products Manufacturers' Association

Associate Members—J. A. Glando, of the Mexico Fire Brick Company, of Mexico, Mo.; S. E. Cullum, of E. M. Pease & Company, Galeon, O.; Gas Machinery Company, Cleveland, O.; Manufacturers' Equipment Company, Dayton, O., and the Stevenson Company, Wellsville, O.

Canadian Railroad Development

Construction work on the Grand Trunk Pacific bridge over the Assiniboine River at Brandon will begin shortly.

The Canadian Pacific Railway is to expend about $175,000 this season for new yard tracks at Moose Jaw, and $200,000 for new shops.

A bill has been introduced in the House of Commons to permit the Imperial Traction Company to build an extension of its already authorized line from Smithville, Ont., to Bridgeburg and from Hamilton to Toronto, and giving the company two years to begin construction and five years to complete the work.

A despatch from Edmonton states that the Albert coal branch of the Grand Trunk Pacific Railway has been completed and that work on another branch line to the Yellowhead Coke Company's mine is now well under way. Work is also being done on a line to the Mountain Park mines On this last steel has been laid five miles west of Edson

A bill has been introduced in the legislature of British Columbia to guarantee the bonds of the Canadian Northern Railway for an additional $10,000,000 for terminals. The bill provides for guarantee for terminals to be constructed at Vancouver, Port Mann and Victoria and for a branch line from Port Mann to a point near Stevenson, on the Fraser River.

A bill has been introduced in the House of Commons authorizing the Canadian Pacific to construct five branch lines as follows: from Snowflake, Manitou, westerly 9 miles; from the terminus of the Gimli branch northerly 60 miles; from Cayley, southerly to Burmis; from the Kleinburg-Sudbury branch westerly to a point on the Ontario & Quebec Railway near Campbellville, and from Montreal, northerly to L'Epiphante, P.Q.

A bill has been reported to the House of Commons for the incorporation of the Manitoba & Ontario Railway Company. This company proposes to build a railway from Fort William to Winnipeg, the proposed line to run between the C. P. R. and C. N. R. lines. The Lake of the Woods would be crossed at Falcon Island. The provisional directors are: J. P. Jones, Dr. W. H. Hamilton, J. T. Horne, W. A. Dowar, Fort William, and J. H. Drew of Guelph, Ont. The head office of the company would be at Fort William

Approximately 2,700 miles of new trackage, involving an expenditure of about $41,000,000, has been undertaken by the three Canadian railway systems according to the programmes of the construction which are announced. This will establish a new record, the totals for 1912 being new mileage 1,975, and expenditures, $30,000,000. The greater part of the new mileage will be in the prairie provinces, although a larger proportion of the expenditures will be on the expensive main line extensions which the Canadian Northern and Grand Trunk Pacific are making through the mountains

The Canadian Pacific Railway during the last year has been engaged on the construction of several huge bridges, among which were most prominent the Highlands bridge across the St. Lawrence River [illegible] the latter being totally completed, and the former in operation for double track until the spring time, when work will be commenced on the demolition of the remaining two old channel spans to be replaced by spans of a more modern type. The third large bridge which is under construction is the Kaministiquia River bridge at Fort William, which is involving a cost of a million dollars. It is a Strauss trunnion bascule bridge [illegible] the main land to Island No. 2, where the company's plant is located. The channel span alone is 185 feet long. In connection with this bridge the company will erect a bridge of the Schertzer rolling lift type across the McKellar River to connect Island No. 2 with Island No. 1. The substructure is already in place and work on the superstructure will begin soon. The McKellar bridge will have space for a highway and street car tracks, and they will be on one level and not on different levels, as in the case of the Kaministiquia River bridge.

The Manitoba Government is planning an extensive scheme of railroad building to serve the northern part of the province, official announcement of which will be made shortly. The proposed lines largely center around Le Pas, which is to be the terminal of the two roads from Winnipeg, one on each side of the lakes. Two lines more are planned for New Manitoba to circle Lake Winnipeg and connect with the federal government's Hudson Bay line from the Lake Winnipeg line to Fort Churchill. The government will turn over the work to the Canadian Northern under a mileage bond guarantee.

Mainly Constructional

The News in Brief—From Coast to Coast

The Cowichan Re-Pressed Brick & Tile Company is a new Victoria concern capitalized at $200,000.

A charter has been granted to the Sechelt Gravel & Construction Co., Ltd., Vancouver, capitalized at $170,000.

The Tyee Shale Products Company, Limited, has been incorporated at Victoria, B.C., with a capital of $100,000.

The City of Westmount, P.Q., have decided to appoint a general manager, who will have the oversight of all municipal affairs.

At Victoria, B.C., announcement is made that the Provincial Government will guarantee $5,000,000 in aid of the Greater Vancouver sewerage scheme.

Messrs. Kennett Tinney & Company, Limited, Vancouver, have been incorporated with a capital of $10,000, to acquire the business of W. Tinney & Company, builders and contractors.

Brick makers throughout Canada and the United States have been asked to each contribute a brick to be used in building a house at the Clay Products Exhibition to be held at the Coliseum, Chicago.

The capital stock of the Brandon Construction Company is to be increased to sixty thousand dollars. The company will undertake the manufacture of all kinds of sashes, doors and mouldings on a very extensive scale.

Mr. John M. Goodell, Assoc. Am. Soc. C. E., Consulting Engineer, New York City, on February 20th delivered a lecture on "Essentials of Technical Writing," before the Graduate Students in Highway Engineering, at Columbia University.

In reply to an alderman last week the mayor of Ottawa, Mr. Ellis, stated that no appointment had been made to the [illegible] unable to induce the men they wanted to consider the ap[illegible]

The Montreal Builders' Exchange [illegible] noon-day luncheon talks. The opening one was on the 20th instant, when Mr. R. L. Werry, the secretary, spoke on labor problems, the work of the exchange, and outlined how members could improve the usefulness of the institution by [illegible] Mr. J. Ballantyne and Mr. T. Gilday [illegible]. [illegible] reciprocal demurrage charges will [illegible].

The [illegible] Shipbuilding Company has received the contract to build two dump scows of 500 cubic yards each for the Dominion Government. They will be constructed of steel throughout and will be used by the Department of Public Works.

The Toronto city council have finally sanctioned the erection of the proposed Royal Bank Building, 250 feet high, on the north-east corner of King and Yonge streets, and the Dominion Bank Building, 190 feet high, at the south-west corner of King and Yonge streets.

At a meeting of the shareholders of the National Portland Cement Company last week, a statement of the year's transactions was presented by Manager Calder. It was shown that, notwithstanding the drop in the price of cement, a material reduction in the outstanding liabilities of the company had been made.

It is announced that Sir William Arrol & Company, Ltd., of Glasgow, designers and constructors of the buildings for The Canadian Vickers Company, at Montreal, are arranging to establish construction works in Montreal for the production of all kinds of cranes, presses, and other machinery, and to otherwise extend their operations in Canada.

At the annual meeting of Standard Clay Products, Ltd., held at the head office of the company, 157 St. James street, Montreal, on February 17th, it was decided to erect a new plant at New Glasgow, N.S. The directors for the ensuing year were elected and subsequently Mr. W. C. Trotter was made president and Mr. Herbert Milson, vice-president.

Swift Current, Sask., has a brick industry in prospect. This is to be established by the Unit Brick Company, a concern that recently established a branch in Regina. Mr. W. G. Orcutt, a representative of the company, was recently in Swift Current for the purpose of explaning the proposition to the Board of Trade and the industrial committee of the council.

The reinforced concrete stack at the power house of the Winnipeg Electric Railway Company, which was built by the Canadian Kellogg Company, Limited, Montreal, is a particularly noteworthy piece of construction. The stack is 13 ft. inside diameter at the top and is 250 ft. high. It is supported on 170 piles driven to rock and is believed to be the largest stack in Canada.

The Stratford Manufacturing Company, Limited, Stratford, Ont., have favored us with the latest copy of their catalogue. The president of this company is Mr. Allen P. Boyer, who is also president of the Goshen Manufacturing Company, of Goshen, Ind., a firm that enjoys the distinction of being the oldest concern in its line in the United States. The catalogue includes descriptions of various lines of ladders, trestles, scaffolds, etc.

A deputation, which waited on the Minister of Public Works at Ottawa last week, proposed that the Harbor of Port Dover be taken over by the government and extended and improved. The deputation represented Port Dover and Brantford. The result is that W. P. Kellett, engineer of the Lake Erie and Northern Railway, will confer with engineers of the Public Works Department and a report will be submitted by them to the government.

The St. Laurent Brick Company will next year double their plant at Laprairie, P.Q., at a cost of $250,000. The financial statement for the past year shows a gross profit of $73,920.93, with a net profit of $31,746.09, from which a 7½ per cent. dividend will be paid, leaving a balance of $10,816.09 to be carried to profit and loss account. The election of directors resulted as follows, Messrs Camille Bourdon, Wilfrid Bessette, P. Desforges, O. Lemay, W. Bessette, Alex. Hogue, and J. O. Martineau.

There were a number of noteworthy exhibits at the Toronto Motor Show held at Exhibition Park, February 20th to March 1st. Among those that came to our attention was the truck shown by the Albion Motor Car Company of Canada. The truck shown a representative of the Contract Record combined many advantageous features, of which the simplicity of parts and ease of control appealed the most strongly. The tires are all nearly double the size those supplied on standard American machines. This is claimed to effect a large saving in operating cost, tire maintenance being the most expensive item in truck operation. An examination of this truck substantiates the claim of the manufacturers that it represents the maximum value in first cost and the minimum cost of upkeep.

Personal Mention

Mr. G. A. Mantle, City Commissioner of Regina, Sask., has resigned.

Mr. W. S. MacCulloch has been appointed Assistant Engineer of the Grand Trunk Railway, at Montreal.

Mr. J. Harvey Self has been appointed Superintendent of Buildings by the Board of Education of the City of Vancouver.

From London, Eng., comes news of the death of Sir Wm. Arrol, a famous English engineer and the designer of the Tay and Forth bridges.

Mr. W. B. Way, Assistant Superintendent of the Canadian Pacific Railway, at Montreal, has been promoted to be Superintendent at Farnham, Que.

Mr. D. McCoe, Superintendent of Grade Separation, Grand Trunk Railway, Toronto, has been made Superintendent of Tracks of the Toronto terminals.

Mr. Henry Ferguson, formerly General Road Master of the Grand Trunk Railway, at Toronto, has been appointed Superintendent of Tracks of the Ontario division.

Announcement is made of the death of Mr. William Minto, for many years City Treasurer of Westmount. Mr. Minto, who resigned the Westmount position last year, was seventy-two years of age.

After a long illness, Mr. Joseph E. Dore, city sanitary engineer of Montreal, died at the Hotel Dieu, aged 57. He died from a complication of diseases. Mr. Dore was the organizer of the city's sanitary department.

Mr. J. T. Garnon has been appointed superintendent of the street cleaning department of Montreal, at a salary of $2,000 a year. Mr. Garnon has recently been employed by the Harbor Commissioners. Two divisional engineers will be named later and their salaries will be $2,000, with a maximum of $2,500 each.

Mr. Richard Wilson, of the Cowan Construction Company, Winnipeg, died recently. Mr. Wilson was a native of England, but had been in Western Canada since 1882, and had engaged in railway construction work all through that country. He had been sub-contractor for the Cowan Company for nine years past.

Mr. E. G. Hewson, formerly Resident Engineer of the Grand Trunk Railway, at Toronto, has been promoted to be Division Engineer of the Ontario division. The grade of Division Engineer is a new one in the Grand Trunk Railway organization, which has hitherto had only a Chief Engineer and his staff of Assistant Engineers and Resident Engineers.

LETTERS

Non-Resident Members of the Canadian Society Get Poor Returns

Editor Contract Record:

If its affairs were properly conducted, the Canadian Society of Civil Engineers would have a great work to do for the members of the engineering profession. Membership in the Society should give a man a good professional standing, but, as it is, nobody is ever asked for references from the Canadian Society, nor is the question raised as to his standing in the Society; indeed, his membership in the body is never considered except in such places as Montreal or Toronto, where the Society is well known. This applies in particular to the Student and Junior Members, who constitute a large proportion of the membership.

To ascertain the reason for this state of affairs we must start at the beginning of a member's participation in the affairs of the Society. A man becomes a Student Member —if urged to do so—as soon as he is eligible. What benefit does he derive from his membership during this period? He gets copies of the Transaction and the Annual Reports, and perhaps once in six months he receives a card stating that such and such engineers are needed on certain works. When in Montreal he has the privilege of visiting the Society's rooms. He may drop in at any of the places where branches are located. In no business connection, however, does he derive any benefit whatever and the matter of his fees comes in for more consideration than the educational work of the Society, particularly if he is not in a position to attend the meetings or use the rooms.

The case of a Junior Member is exactly the same, and that of an Associate Member differs very slightly. In this part of the country, and in the Maritime Provinces generally, membership in the Society carries little or no weight. From my experience I feel confident in stating that conditions are almost the same in Ontario—in places removed from the centres.

The condition that results from this state of affairs is that the average member takes no active interest in the Society other than to look forward to some indefinite future participation in the Society as a source of pleasure and benefit. And generally with the engineer the future is almost negligible—the present is too full of active work. There is the fight for existence in the present, with perhaps a hope of ease in the future. The Society confers no present benefit. Its affairs have little weight with the location engineer who spends twelve months of the year in the wilderness, or with other members of the profession in charge of work which takes up their attention day in and day out for two or three years at a time.

My observations apply particularly to non-resident members. These constitute a large proportion of the membership, and in view of the large number of "non-residents" who are not members of the Society, it would seem worth while to adopt some means of making membership in the Society more attractive. If such means were taken, the membership [illegible] and influence of the Society would benefit materially. So that the question is: What steps should be taken to provide an incentive to every engineer in the Dominion to become an active member of an active body? This is a matter of considerable speculation. So far, to the average "non-resident," membership in the Society has hardly been worth while from a business standpoint and certainly not more so from a social standpoint. Could not the Society be at least a good reliable reference as to a man's professional standing? Not a great deal of extra work would be entailed in keeping a professional record of each member. As it is, when a man needs a reference he has to give the name of a man of whom his prospective employer may have never heard.

The question of settling a standard of remuneration for various work, and the organization of civil engineers on a par with other professions, has provided some discussion in the past. This is a large undertaking, but its consummation might be effected in time. The branches are a good idea, but the establishment of branches should be carried out more extensively. In any case something must be done to increase both the interest and the membership if the Society is to be made successful. No man wishes to invest money and get no returns—with little prospect of ever doing so—and this is the position of the majority of the non-resident members of the Canadian Society of Civil Engineers.

Yours truly,
F. W. Wetmore
(Woodstock, N.B.).

The Canadian Society as a Trade Union

Editor Contract Record:

In regard to the editorial article in your issue of February 5, and relating particularly to the matter of using the Society's influence to prevent the importation of foreign talent, I am of the opinion that the less the Society meddles with such matters the better it will be for its dignity. Corporations and other communities will claim the right to suit themselves as to whom they employ, in the same manner as individuals would resent any such interference on our part; moreover, if the Society were to interfere, it would no longer be regarded as a technical organization for the promotion of scientific knowledge but as a mere trades union. In such an event we should probably be invited to send delegates to the Trades and Labor Congress, or we might have to contribute funds to deal with bridges and other structures planned by "non-union" engineers.

The Canadian Society embraces in its membership citizens of the entire world and residents of all countries. Of our fourteen honorary members only four reside in Canada, and of the full membership eighty-one are registered as residing outside of Canada. It would appear to me, therefore, that a technical society with such a promiscuous membership would act unwisely if it were to offer masked advice to bodies seeking engineers, especially if that advice were, in effect, to keep inside the bounds of the Dominion.

Yours very truly,
W. MURDOCH

Test of Hoisting Cable

Editor Contract Record:

We notice in your issue of February 19th an interesting article setting forth the fact that it had taken a pull of 364 tons to break the largest hoisting cable in the world. Will you kindly inform us what diameter the rope was

Yours very truly,

Since the publication of the item on page 42 of our issue of February 19th, we have received supplementary information from Mr. L. D. Conkling, Associate Professor of Civil Engineering in Lehigh University. These cables were made of plow steel and were 3 inches in external diameter. The [illegible] of 580,000 lbs. and 596,000 lbs. The unused section of the cable broke under a load of 728,000 lbs. The cable was designed to break under a computed load of [illegible]

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Montreal, Que.

[illegible] [illegible] sidewalks planned by La[illegible] Municipal Council. Engineer in [illegible] [illegible] street. Pavements on St. Joseph and Notre Dame streets. Council also contemplates extending water and light plants to Summerlea and Lachine Heights.

North Battleford, Sask.

Sewer pipe, etc. Contract "S.". Furnishing vitrified tile sewer pipe and junctions. Mayor, D. S. Walker. Con. engineers, Chipman & Power, Mail Building, Toronto and Canada Building, Winnipeg. Sec.-Treas., H. W. Dixon. Contract "T." Constructing concrete sidewalks and curbs. Contract "B." Furnishing cast iron and steel water pipes and specials. Contract "E." Fire hydrants and gate valves. Plans, specifications, etc., at offices of engineers and secretary-treasurer after March 17th. Tenders received by Sec.-Treas. until April 15th.

Oak Bay, B.C.

Paving. Municipal council will prepare cost estimates for the entire length of Oak Bay avenue within the municipal limits.

Ridgetown, Ont.

Waterworks system, cost $7,000, planned by town council. Clerk, D. Cochrane. Engineer in charge, F. W. Farncombe, Dundas and Richmond streets,

St. John, N.B.

10 in. water main will be laid from north end of present 10 in. pipe in Prospect street to connect with 8 in. main in Mt. Pleasant avenue. Commissioner Water and Sewerage, R. Wigmore. Engineer in charge, Wm. Murdock, City Hall.

Saskatoon, Sask.

Tenders received by City Commissioners until March 28th. For construction of approximately 42,000 sq. yds. of pavement, and 12,800 ft. of concrete gutter. Plans, specifications, etc., at office of Engineer. Chairman, Mayor F. E. Harrison. Engineer, Geo. T. Clark.

Pumps. Tenders received until April 15th by Chairman, Mayor F. E. Harrison. For one motor pumping engine of 500 gallons capacity, 1 motor pumping engine of 1,000 gallons capacity. Tenders to quote on their own specifications.

Sidewalks. Chairman, Mayor F. E. Harrison. Engineer, Geo. T. Clark. Tenders received by City Commissioners until March 28th for 265,390 sq. ft. of concrete walk; 5,700 sq. ft. of lane crossings; 28,760 lin. ft. of separate curb; 22,050 lin. ft of combined curb. Plans, specifications, etc., at office of Engineer.

Swift Current, Sask.

1,700 ft. of 10 in. sewer, cost $3,500, planned by town council. Secretary, Geo. D. Arnott. Engineer, Geo. D. Mackie. By-law to be submitted shortly.

Concrete reservoir, cost $20,000, for purpose of gravity water supply for town. Secretary, Geo. D. Arnott. Engineer, Geo. D. Mackie.

Extension to waterworks system, cost $50,000, planned by town council. Sec., Geo. D. Arnott. Engineer, Geo. D. Mackie. 22,000 ft. extension to waterworks mains. Plans, specifications, etc., at office of engineer. Tenders received by Secretary until March 17th.

Toronto, Ont.

Tenders will be received until March 18th for sewage pumps with motors and automatic starting devices. Specifications, etc., at department of works. Board of Control. Mayor, H. C. Hocken .

Park and roadway improvements, planned by Board of Control. Parks Commissioner, C. E. Chambers. Estimates include the following:—Addition to conservatories, Allan Gardens, $20,000; Exhibition Park improvements, $32,000; improvement of roads and new pavilion High Park, $46,000; seven new play grounds, $23,000; driveways in Rosedale Ravine, $15,000; Island Park improvements, $42,000.

CONTRACTS AWARDED

Port Arthur, Ont.

Pipe, etc., cost $191,306. Engineer, L. M. Jones. Commissioner of Utilities, J. J. Hackney. General contractors, Drummond, McCall & Co., 28 Victoria square, Montreal.

St. John, N.B.

Pavements, planned by city council. Secretary, H. E. Wardroper. Commissioner of Public Works, Miles Agar. Engineer in charge, Geo. Hatfield, City Hall. Britain, Union and Germain streets, granite block paving, $42,179; N.S. King square, bituminous macadam, vitrified brick and concrete, $9,634; Charlotte street, bituminous macadam and vitrified brick, $20,400; Queen and Duke streets, bituminous macadam, $6,615; Union, Princess and S.S. King square, asphalt, $28,212.50; Germain street, bituminous concrete, $8,028.75; Chipman Hill, Garden and Dorchester streets, rocmac, $17,893.75; Horsefield street, concrete, $3,690.50; Sidney street, sheet asphalt and granite blocks, $8,700.

Railroads, Bridges and Wharves

Avonlea, Sask.

C. N. Rly. Co.'s location of proposed third class station here has been approved.

Carleton, Point, P.E.I.

Car ferry terminal. Dom. Govt. Dept of Railways and Canals. Secretary, L. K. Jones, Ottawa. Tenders received by Secretary until March 25th. Plans, specifications, etc., at offices of Chief Engineer of Dept. of Railways and Canals, Ottawa, Chief Engineer of of Intercolonial Railway, Moncton, N.B. Horace McEwen, Supt. of Prince Edward Island Railway, Charlottetown.

District of Nipissing, Ont.

C. N. O. Ry. Company's locations of stations at the following places have been approved. (a) Boulter, Twp. Boulter, mileage 195.65; (b) Yellek, Twp. of Cammanda, mileage 234.61; (c) Cauchon Lake, Twp. Boyd, mileage 178.25; (d) Mink Lake, Twp. Pentland, mileage 183.8 from Ottawa.

Fraser Mills, B.C.

C. P. Rly. Co. has been authorized to construct 2 spurs for the Canadian Western Lumber Co., Ltd., Dist. of New Westminster, B.C.

Glenella, Man.

C. N. Rly. Co.'s location of a third class station at Glenella, Man., has been approved.

Hamilton, Ont.

T. H. & B. Rly. Co. has been authorized to construct 2 spurs for D. A. McIlroy, Hamilton, Ont.

Medicine, Hat, Alta.

C. P. Rly. Co. has been authorized to construct spur for the Alberta Glass Bottle Co., Ltd.

Montreal, Que.

C. P. Rly. Co. has been authorized to construct industrial spur for Messrs. Reid, MacGregor & Reid in lot 641/3.

District of Newcastle, B.C.

The Esquimalt & Nanaimo Rly. Co. has been authorized to construct bridge No. 180 across Nile Creek on its Comox extension.

Underground conduit system, St. Catherine street. Tenders will now be received by engineer after March 10th. (1) Section from Guy street along St. Catherine to Papineau ave; groups of 15 and 20 3½-in. square tile on each side of street for main ducts, groups of 3 on each side of the street of 3½-in. fibre conduit for service wires, 4 manholes at tramway crossings, 2 manholes at street corners.

Province of Ontario

The Central Ontario Rly. Co. has been authorized to construct branch line from Marmora mileage 61.02 to Delora, Ont., crossing County Rds., Co. Hastings, Ont.

Pt. Burwell, Ont.

Station, cost $7,000, for C. P. R. Architect-engineer, W. Tapley, London. Two storeys, 50 x 30, white brick construction, cement foundation. Plans in progress.

Prince Rupert, B.C.
Station for G. T. P Rly. Architect, D. J .Myers, Seattle, Wash. Construction engineer, Virgil Bogue, Seattle. Plans in progress.

G. T. P. Rly. Co. has been authorized to construct 5 bridges, namely, (a) Bridge No. 195,2 across Porphyry Creek, Prince Rupert E., B.C.; (b) Bridge No. 198,1 across Boulder Creek, Prince Rupert E.; (c) Bridge No. 213,1 across Trout Creek, Prince Rupert E.; (d) Bridge No. 235,6 across Telkwa River, Prince Rupert E.; (e) Bridge No. 81,2 across Fiddle Creek, Wolf Creek W.

St. Gabriel de Brandon, Que.
C. P. Ry. Co. has been authorized to construct spur into the premises of the Canadian Charcoal Co., Ltd., in Sub Div. Lot 79 of Cadastral Lot 231.

Twp. Scarboro, Ont.
C. L. O. & W. Rly. (C. P. R.) Co. has been authorized to construct subway between Cons. 3 and 4, Twp. Scarboro, Co. York, at mileage 180.56 from Glen Tay.

Twp. of Toronto, Ont.
C. P. Rly. Co. has been authorized to construct spur for the Ontario National Brick Co., Ltd., in Lot 19 Con. 1, north of Dundas street, Twp. Toronto, Co. Peel, Ont.

Toronto, Ont.
Subways on Davenport road, Spadina road, Howland avenue and Bathurst street, for Canadian Pacific Railway. Engineer grade separation, B. Ripley, 262 Avenue road. Tenders received by Engineer until Thursday, March 20th.

Trenton, Ont.
C. L. O. & W. Rly. (C. P. R.) Co. hsa been authorized to construct bridge over Marmora street, mileage 87.76 from Glen Tay.

County of Wellington, Ont.
Tenders will be called in the spring for retaining walls for Mt. Forest bridge. Engineers, Bowman & Connor, 36 Toronto street, Toronto.

Weyburn, Sask.
C. P. Rly. Co. has been authorized to construct spur into the premises of J. I. Case, Threshing Machinery Co., Weyburn, Sask.

Winnipeg, Man.
G. T. P. Rly. Co. has been authorized to construct (1) bridge, 498.7 across Eagle Creek, west of Winnipeg, and (2) bridge 1101 across Little Shuswap River, west of Winnipeg.

CONTRACTS AWARDED

Cap de la Madeleine, Que.
Extension to wharf, cost [illegible] General contractor, Chas. Page, Three Rivers, Que. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa

Hamilton, Ont.
Retaining walls, cost [illegible] Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Messrs. J. Taylor, W. H. Poupore, J. W. Hennessy and W. H. Dwyer, of Ottawa, Chapleau, Ont., Fort Coulonge, Que., and Ottawa respectively.

L'Islet, Que.
Wharf superstructures, cost $23,400. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractor, J. B. Gallibois, L'Islet.

Lockport, Man.
Fishway, cost $4,456. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Wm. Newman & Co., Ltd., 40 Ashdown Building, Winnipeg. For construction of fishway for St. Andrew's Dam, Red River, Lockport, Man.

Ottawa, Ont.
Sedimentation basin, cost $17,000, Lemieux Island. Mayor, J. A. Ellis, City Hall. Controllers, Nelson, Parent, Kent and Hinchey. Basin and piping required for temporary water supply. Engineer in charge, Wm. Storrie, A.M.I. C. E.

Six steel hopper scows, cost $89,100. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Geo. T. Davis & Son, Levis, Que.

Co. of Waterloo, Ont.
Bridge, planned by county council. Engineers, Bowman & Connor, 36 Toronto street, Toronto. General contractors, Hamilton Bridge Works Co., Barton and Bay streets, Hamilton. Work has not yet been started.

Public Building, Churches, Schools, etc.

Aldboro, Ont.
School, cost $7,000, for Trustees S.S. No. 1. Address, J. A. Buchanan, Eagle P.O., for further particulars. Builders, A. McKillop & Sons, West Lorne. Tenders received by Mr. Buchanan until March 21st. Two sty., stone and cement foundation, brick construction.

Brantford, Ont.
Church, alterations and additions, cost $6,000, contemplated by the Brant Ave. Methodists. Chairman of Commission, T. Harry Jones. Architect not yet appointed.

Calgary, Alta.
College building in the west end of city, for The Mount Royal College. Plans of Architect, G. Leuschner, have been accepted.

Delhi, Ont.
Church, cost $7,000, for Baptist Congregation. Tenders received by Pastor, Rev. W. T. Spiddell, until March 10th. One storey and basement, stone and cement foundation, stone trimmings, brick construction.

Edmonton, Alta.
Land titles building, Howard and May streets. Prov. Govt. Dom. of Public Works. Minister, Hon. C. R. Mitchell. Two storeys, 111 x 60 ft. 7 in., sandstone and structural steel construction, concrete floors, felt and gravel roofing. Foundations in.

Public lavatory, corner McDougal and Rice streets, contemplated by city council. Clerk, F. M. C. Crosskill. Architect, Mr. Jeffers, City Architect. Plans will be prepared shortly.

Freeport, Ont.
Sanitarium. Owner in trust, Rev. [illegible]

north, Berlin. Tenders received by Builder, C. Cowan, 200 Victoria street, Berlin, until March 18th.

Hamilton, Ont.
Church, cost $60,000, for Barton street Methodist Congregation. Pastor, H. G. Livingstone, 182 Sanford avenue north. The Board of Managers recommend new building.

Kingston, Ont.
Barracks, cost $20,000, Princess, for Salvation Army, headquarters Toronto. Tenders close with Architect, Major Miller, 20 Albert street, Toronto, March 6th. Two storeys, 40 x 60, stone foundation, brick construction.

Listowel, Ont.
Drill and agricultural hall, cost $10,000, contemplated by town council and Dom. Govt. Dept. of Militia and Defence. Secretary, E. F. Jarvis, Ottawa. Town clerk, Wm. Bright. Plans will be prepared.

London, Ont.
Addition to hospital, cost $50,000, for Catholic Church, Mother Mechilde. Private plans are being prepared. Three storeys, 80 x 50, white brick, stone trimmings, stone foundation.

Montreal, Que.
Church, Victoria avenue, Westmount, for Presbyterian Congregation. Trustees, Messrs. J. Smith, 15 Windsor Ave., J. A. Hawthorne, 316 Grosvenor street, Dr. Herbert Ross, 4178 St. Catherine street. The building is to replace the Stanley street church which has been sold. Plans will be prepared.

Fire and police station, cost $50,000, Notre Dame. Secretary, L. N. Senecal. Architect, Alphonse Piche, 52 Victoria square. The calling of tenders was postponed. They will now be received by Secretary after March 1st. Two storeys, 120 x 70, stone and brick construction.

Newmarket, N.B.
Church, cost $5,000, for R. C. Diocese. Rev. Father Cormier, Kingsclear, N.B. Plans in progress. Work to start in spring.

Oshawa, Ont.
Addition to hospital, cost $20,000. Sec. Comm., Mrs. R. S. McLaughlin. Architects are being asked to submit preliminary plans for addition of surgical wing, maternity dept., etc. Tenders are to be called as soon as sketches are aproved. Work is to be rushed to completion. Further particulars from Secretary.

Ottawa, Ont.
Town hall is contemplated by the Village Council of Eastview. Mayor, C. Gladu, McArthur Road, Eastview. Plans will be prepared.

School, addition, cost $25,000, Hopewell. Secretary, C. Ross, Elgin street. Architect, W. G. Garvock, Creighton street, is preparing plans. Stone foundation, solid brick construction.

School, addition, cost $85,000, Powell street. Secretary, C. Ross, Elgin St. Architect, W. B. Garvock, Creighton street. Stone foundation, solid brick construction. Plans drawn

Prince Albert, Sask.
Isolation Hospital, cost $7,000. Architect, O. Albrechtsen, 22 10th street west.

[illegible] approved by the Victoria Hospital Board. Secretary, F. Law

[illegible], cost $5,000, for S. McLeod. Architect, Eric Wojaughn, Ag-[illegible] cement foundation, white marble and tile construction. Work to be done by day labor.

Regina, Sask.

Fire Hall, cost $16,000. Clerk, A. W. Pool. Architects, Storey & Van Egmond, Credit Foncier Bldg. Two stys., 2-door fire hall, including furniture, fire [illegible] and sundries. By-law passed on February 25.

[illegible] cost $150,000, 2? cells, Osler street. Clerk, A. W. Pool. Architect, Mr. Fulton, Strathcona Block. To be built next spring. Three storeys, 100 x 75, terra cotta and brick construction, fireproof floors, felt and gravel roofing. By-law passed on Feb. 25.

[illegible] Feb. 25th, 1913, to raise $117,000 for purchasing and installing health and scavenging equipment and acquiring a new incinerator and improving the present one. Also building of a transfer station and stable and to carry on the health department, acquire such other necessary equipment, also to provide for the raising of $134,000 for the purpose of constructing a winter fair building and amphitheatre and to provide a heating system for the present auditorium building and adjoining stables at the exhibition grounds, and $7,500 to remodel, improve and furnish the present market building, for the various civic depts. For installing therein public lavatories and baths and for acquiring weigh scales. Clerk, A. W. Pool

St. John East, N.B.

Mission hall, for Home Mission Board of Presbyterian Church, c/o Geo. T. Knight, St. John E. Architect, F. Neil Brodie, 42 Princess street. Tenders will be called soon. First floor, gymnasium, 30 x 40, locker room and shower bath; second floor, office, reading room and library. Two storeys, 60 x 30, concrete piers, frame construction.

Saskatoon, Sask.

The R. C. School Commissioners are contemplating erecting frame school on 22nd street and Spadina. Plans will be prepared.

St. Laurent, Que.

Public building. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders received by Secretary until March 25th. Plans and specifications at offices of J. Sawyer, architect, 407 Guy street, Montreal, Post Office, St. Laurent, and at Dept., Ottawa, specifications also at office of MacLean Daily Reports, Toronto. See advt. in Tenders and For Sale Dept. of this issue.

Tignish, P.E.I.

Post office fittings. Tenders received by Secretary, R. C. Desrochers, Ottawa, Dom. Govt. Dept. of Public Works, until March 14th. Plans and specifications at office of F. S. Gaudet, clerk of works, Public Bldg., Tignish, W. J. J. McDuff, Supt., Charlottetown, P.E.I., and at Dept., Ottawa. Specifications also at office of MacLean Daily Reports, Toronto.

Twp. of Barton, Ont.

School, four rooms, cost $20,000, planned by Trustees of School Section No. ; Chairman, Andrew McVittie, Mt. Hamilton. Architects, Brown & Fryer, Clyde Block, Hamilton. Tenders will be called in about two weeks. Two stys., 98 x 48, brick and artificial stone, stone foundation.

Toronto, Ont.

Addition and alterations to theatre, cost $5,000, Dundas and Dufferin, for R. Taglietti. Architects, Redmond and Beggs, 311 Kent Building. Doubling present capacity. Two storeys, 35 x 160, brick foundation and construction, felt and gravel roofing. Plans drawn.

Vancouver, B.C.

Club and school building, cost $70,000, Haro street, for The Congregation of the Holy Rosary Church. Architects, Tegan & Vezina, 837 Hastings street west. Three storeys, 66 x 132, concrete foundation, brick construction and structural steel, building will include lunch rooms, assembly hall, dining room, kitchen, etc. Tenders will be called shortly.

The German Lutheran Congregation have purchased a lot at 12th and Quebec streets, 88 x 100 ft., on which they intend to erect a church in the near future.

Forestry building, cost $22,000, Hastings Park, planned by Board of Control. Clerk, Wm. McQueen. Architects, Stuart & White, 837 Hastings street west. 80 x 190, framework of logs, 3 to 4 ft. thick x 28 ft. long, mezzanine floor. Plans were selected in competition.

Fine arts and education buildings, Hastings Park, planned by the city council. Clerk, Wm. McQueen. Architect, G. M. Bayly, Dominion Building. 40 x 115, central section, 40 x 40 with wings, 35 x 35 each, fireproof, dome over central section and skylights in wings. Plans were selected in competition.

Victoria, B.C.

Public market building contemplated. Clerk, Wellington J. Dowler. City council has appointed committee to investigate matter.

Winnipeg, Man.

Church, contemplated for Crescent Denominational Congregation, MacMillan and Aynsley streets. Committee has been appointed to estimate cost.

Woodstock, Ont.

Skating rink, Perry street, for the Woodstock Arena Co. President, F. Millman. Secretary, A. W. Muir. 100 x 190, steel frame, galvanized iron roof galleries. Plans in progress.

CONTRACTS AWARDED

Chatham, Ont.

Country home, cost $10,000, High Banks, for Dr. Geo. McKerough. Architects, J. L. Wilson & Son, 64 Market Building . General contractors, The Blonde Lumber & Manufacturing Co., 49 Dover street, $7,500. Plumbing and heating not yet let. 2½-storeys and basement.

Edmonton, Atlta.

Dormitory building, cost$ 125,000, University of Alberta. Prov. Govt. Dept. of Public Works. Dept. minister, John Stocks. Architect, Prov. architect. Four storeys, 400 x 60, stone and pressed brick construction, cement foundation. Work to be done by day labor. Foundations started.

Mount Forest, Ont.

Library, cost $8,145. Clerk, M. O. MacGregor. Architect, Geo. Gray, Harriston. General contractor, Walter H. Hutchinson, Clifford, Ont., will sublet heating and wiring contracts later. Work to start as soon as possible. Two stys., 45 x 45, equipment required.

Montreal, Que.

Postal station, cost $200,000, St. Catherine street. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Architects, Cox & Amos, 78 Crescent street. General contractor, C. E. Deakin, 11 St. Sacrament street. Sub. tenders received by General Contractor. Four storeys, 42 x110, cement foundation, cut stone, reinforced concrete, structural steel construction.

Immigration detention hospital, cost $75,000, St. Antoine. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Architects, Ross & MacDonald, 1 Belmont street. General contractor, mason and carpenter, C. E. Deakin, 11 St. Sacrament street. Iron and steel, Ford Iron Co., Ltd., Beardmore Building. Roofing, painting, heating, plumbing and electrical, Sibley & Hout, 77 Duke street. Sub tenders are being received by General Contractor. Two storeys, 119 ft. 6 in. x 114 ft. 6 in., cement foundation, reinforced concrete and structural steel construction, tile and maple floors. Excavation started.

Oshawa, Ont.

Alterations to public building, cost $5,194. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractor, S. F. Whitham, Belleville, Ont.

Regina, Sask.

Normal school, cost $250,000, 16th avenue. Prov. Govt. Dept. of Public Works. Acting Deputy Minister, H. S. Carpenter. Architects, Storey & Van Egmond, Northern Bank Building. General contractors, The Parsons Construction Co., Scarth street. Heating, The Regina Plumbing Co., Hamilton street. Three storeys, red pressed brick construction, faced with Bedford stone. Foundations in.

Sault Ste. Marie, Ont.

Vaudeville theatre and 3 stores, cost $36,000, Gore street, for Mark Cahill, 11 Albert street. Architect, G. Drew (Drew & Gourlay), 457 Queen street. Foundation, J. H. Ableson. Construction of building will commence April 1st. Two storeys, 58 x 100, structural steel and terra cotta construction, brick foundation. Excavating started.

South Edmonton, Alta.

Hospital, cost $100,000, planned by town council. Architects, Wilson & Herald. Con, Achitect, Meyer J. Strum, 116 S. Michigan avenue, Chicago, Ill. General contractors, Olson & Johnson, Edmonton and Calgary. Four storeys, 150 x 50, and basement, 150 x 50, structural steel and pressed brick construction, stone trim. Foundations in.

Toronto, Ont.

Church of St. Mary The Virgin (Anglican), Westmoreland. Pastor, Rev. Anthony Hart, Delaware and Bloor St. Architect, Wm. A. Langton, 82 King street east. Masons, J. C. Bayliss & Co., 265 Gladstone. Carpenters, Walker & Robertson, c/o architect. Iron and steel, Dom. Bridge Co., 289 Sorauren.

Roofing, Con. Supply Co., 220 King west. Painting, A. E. Phillips, 49 Richmond east. Heating, J. Ritchie, 56 Adelaide east. Plumbing, Fiddes & Hogarth, 122 King east. Electrical, G. J. Beattie, 72 Victoria. Hardware, Aikenhead Co., Temperance street. Plaster, Jos. Malton, 11 OConnel avenue. Stone foundation, brick, stone and structural steel construction.

Watford, Ont.

Library, cost $5,099. Builder and general contractor, G. O. Stephenson.

Winnipeg, Man.

Convent for The Rev. Oblate Sisters. Architect, J. A. Hudson, 705 Builders' Exchange Building ,Winnipeg. General contractor, I. Benoit,, St. Boniface. Heating, plumbing and 'electrical, Charette & Kirk, St. Boniface. Three stys. and basement, 100 x 56, cement foundadation, concrete block construction.

School, cost $15,000, planned by Board of Education, Elmwood. General contractors, Worswick Bros., Poplar ave., Elmwood. Roofing, H. Hilton & Sons, Erin street. Heating and plumbing, Charette Kirk Co., Ltd., 510 Des Meurons. Electric, the Shipman Electrical Co., Ltd., 396 Portage ave. Hardware, J. H. Ashdown Hardware Co., Ltd., Bannatyne E.

Business Buildings and Industrial Plants

Amherstburg, Ont.

Addition to factory, planned for Amherstburg Canning Co. Manager, Mr. Burkhart. New process machinery required. One storey, 80 x 22, brick construction, electric lighting, plumbing.

Brandon, Man.

Shoe factory, planned for W. Percy Gillespie & Co., 46 Clement Block. Work to start this spring.

Departmental store, planned for Hughes & Co., 152 10th street. Nine storeys, work to start this spring.

Brantford, Ont.

Office and warehouse, cost $8,000, for The Slingsby Mfg. Co. (Woollen Mills). Secretary, John R. Varey. Architect, L. D. Barber, Temple Building, Dalhousie street, is preparing plans. Tenders will be called about March 6th. Three storeys, 50 x 50.

Bridgewater, N.S.

Apple warehouse, cost $3,500, for Lea Ham Valley Fruit Shipping Co. Sec., J. W. Hibb, Bridgewater. Interested, Albert Rodenhiser & Bamford West, Bridgewater, N.S. Plans in progress.

Cooksville, Ont.

Store and residence, cost $5,000. Designing & Draughting Co., 36 Toronto street, Toronto, are preparing plans.

Duncans, B.C.

Creamery. The Duncan Creamery Co., contemplates erecting new plant at once.

Dundas, Ont.

Packing factory for [illegible] Packing Co., Chicago, U.S.A. Ten acre tract has been purchased in the vicinity of Dundas, and plans will be prepared.

Edmonton, Alta.

Store and apartments, cost $20,000, 14th street, for C. A. Lowe, 247 14th street. Architects, Barnes & Gibbs, Imperial Bank Building. Three storey, 50 x 55, cement foundation, brick and stone construction.

Goderich, Ont.

Factory, cost $40,000, contemplated for Rice, Knight Ltd., 88 Richmond St. east, Toronto. Manager, H. W. Knight. Will manufacture electric motors. By-law to be submitted to ratepayers.

Leamington, Ont.

Offices, cost $10,000, for Dr. Hillier, Talbot street. Architect not yet chosen. Two storeys, 28 x 50. Plans in progress.

London, Ont.

Carton factory, cost $25,000, planned for Dominion Carton Co. For further particulars address, M. P. McDonagh, Richmond street. Equipment required.

Montreal, Que.

Warehouse, St. Catherine and St. George streets, planned for Messrs. Z. Fineberg & Sons, 62 St. James street. Building will not be started till May 1st, 1914.

Ottawa, Ont.

Store, cost $25,000, for A. E. Rea & Co., Ltd. Architect, Ross & MacDonald, 1 Belmont street, Montreal. Stone construction. Plans in progress.

Large addition is contemplated to Hotel Cecil. Owner, W. T. Wallace, 106 Bank street. Architect not decided on yet.

Winnipeg, Man.

C. Stemman, builder, has taken out a permit for the erection of a warehouse on Andrews street. Cost $20,000.

Addition and alterations to Downing Hotel, cost $3,000, Lombard street. Plans in progress.

CONTRACTS AWARDED

Calgary, Alta.

Office and stores, cost $40,000, 8th ave. west, for J. K. Lee & Co. General contractors, G. H. Bishop & Co., David Block. Two storeys, 50 x 130, cement foundation, brick construction.

Bottling house, cost $6,000, for Calgary Brewery & Malting Co. Architect, Bernard Barthel, Chicago, Ill. Work being done by owners. Three storeys, 32 x 60, reinforced concrete, structural iron, brick construction. Excavating done.

Stores and apartments, cost $8,000, for C. H. Powell, 803 5th ave. west. General contractor, R. P. Hickle, 12th ave. west. Two storeys, 22 x 72, cement foundation, brick construction. Excavation started.

Hamilton, Ont.

Factory, cost $25,000, Irondale, for Steel Company of Canada, Ltd., Sherman ave. north. Architects, Prack & Perrine, 36 James street south. General contractors, H. G. Christman & Co., Main & Hughson streets. Building to be completed about May 1st.

Toronto, Ont.

Storehouse, cost $6,000, Berkeley St Owners and builders, Patterson Mfg. Co., 172 King street east. One storey, [illegible] x 100, frame construction, cement foundation.

Vancouver, B.C.

Store and rooming house for Mr. Dick, care architect, H. B. Watson, 16 Hastings street east. General contractors, W. G. Wilson & Son, 118 10th ave. west. Heating, Barr & Anderson, 1060

Homer street. Four storeys, 25 x 122, brick and mill construction.

Prince Albert, Sask.

Bank building 1st avenue west, for The Bank of Ottawa. Manager, T. B. Sharpe. Architect, Creighton & Crowther, have prepared plans. Two stys., 55 x 45.

Prince Rupert, B.C.

Hotel, cost $1,000,000, for G. T. P. Rly. Architect, F. M. Rattenbury, 621 Sayward Building, Victoria, B.C. Pressed brick exterior, stone trimmings. Plans in progress.

Princeton, B.C.

Bank building for The Bank of Montreal. Head office, Montreal. Will be erected at corner of Vermillion avenue and Bridge street. Plans in progress.

Roxton Falls, Que.

Furniture factory contemplated for The Labribiere Co., Ltd. Machinery required, water and steam power. Plans will be prepared.

Sault Ste. Marie, Ont.

Business block and offices, cost $20,-000, Queen street, for Alfred W. Maybury, Moose Jaw. Architect, G. Drew (Drew & Gourlay), 457 Queen street. Tenders have been received and contract will be awarded in about 2 weeks. Two storeys, 55 x 60.

Sorel, Que.

Addition to factory for Popular Mfg. Co., manufactures shirts, C. O. Paradis, Augusta street. Iron columns, stone and brick. Plans in progress.

South Woodslee, Ont.

Flour mill, planned for Thos. P. Hooker. Equipment required, gasoline engine, grain cleaner, shellers, choppers, etc. Two storeys, white brick construction, stone and cement foundation.

Toronto, Ont.

Alteration to offices, cost $15,000, [illegible] Yonge street, for A. F. Webster & Co., corner King and Yonge streets. Architect, C. J. Gibson, 75 Yonge street. Five storeys, brick foundation, structural steel and brick construction. Plans ready.

Bakery, cost $4,000, Davenport, for H. Haag, 820 Yonge street. Architect, A. Stratford, 113 Constance street. Two storeys, 26 x 79, brick foundation reinforced concrete and brick construction. Plans drawn.

One pair stores and residence, cost $8,500, Dovercourt, for Dr. Teskey, 612 Spadina avenue. Architect, W. G. Hunt, 990 Bloor street west. Two stys., [illegible] x [illegible], stone foundation, brick construction. Plans drawn.

Alterations to building, [illegible] King street east, for T. J. Medland Ltd., 118 King street east. Architects, Redmond & Beggs, Kent Building. Tenders received by owner for excavating and underpinning.

Vancouver, B.C.

Store and rooming house, cost $[illegible],000, 816 Granville street, for R. V. Allen, 29 Hastings street west. Architects, Branson & Liebert, 142 Hastings west. Four storeys, brick construction. All General Contractors tenders were rejected and work will probably be done by day labor.

Woodstock, N.B.

Extension to Aberdeen Hotel. Pro-

[illegible] H. McInerney. Present [illegible] and a brick [illegible]. Plans will be prepared

CONTRACTS AWARDED

Berlin, Ont.

[illegible] 270 [illegible] Knechtel. [illegible] x 70.

Coquitlam, B.C.

[illegible] cost $10,000, for The Goddard Mercantile Co., 123 Pender street west, Vancouver. Architect and general contractor, The Coquitlam Construction Co. Two storeys.

Edmonton, Alta.

[illegible] office building, cost $150,000, 1st street, for R. Tegler, Tegler Block. Architects and general contractors, G. H. Archibald & Co., Ltd., 827 Union Bank Building. Heating, The Standard Plumbing Co., Athabasca avenue. Five storeys to be added to present three storey building, 100 x 75, reinforced concrete and structural steel construction.

Departmental store, cost $60,000, for Alex. Livingston, Namayo avenue. Architects, Barnes & Gibbs, Imperial Bank Building. General contractor, M. Sporcan. Three storey, 99 x 100, cement foundation, brick construction, structural steel.

Temperance Hotel, cost $20,000, Carey and Pine, for McDonald Bros. Architect, Mr. Bail. General contractor, Kenneth Stuart. Three storeys, 41 x 81, frame and brick construction, cement foundation.

Galt, Ont.

Creamery, cost $7,000, for S. E. Hunter. Builder and general contractor, W. Parker, c/o owner. General machinery and equipment needed, cement foundation.

Macleod, Alta.

Hotel, for W. H. Atkins, 26th street. General contractor, J. S. Lambert, 23rd street. Three storey, 25 x 83, cement foundation, brick and structural steel construction.

Montreal, Que.

Stables, cost $7,000, Frontenac, for Ice Mfg. Co., Ltd., 132 Board of Trade Building. Architect, R. E. Bostrom, 132 Board of Trade Building. General contractors, Purdy & Henderson, New Birks Building. Two storeys, 86 x 75, brick construction, cement foundation, felt ond gravel roofing.

Factory, cost $70,000, for Consumers Cordage Co., 283 St. Patrick street. Architects, Ross & MacDonald, 1 Belmost street. General contractor, C. E. Deakin, 11 St. Sacrement street. Sub tenders will be received by General Contractor after March 1st. Three storeys, 140 x 200, reinforced concrete, solid brick construction, cement foundation.

Planing mill, cost $5,000, Owners and builders, J. & W. Duncan Co., Ltd., 1833 Ontario street. Two storeys, 40 x 80, cement foundation, 3 in. R Plank, solid brick construction, spruce floors, felt and gravel roofing. Machinery required.

Port Arthur, Ont.

Alterations to stores, offices and apartments, cost $3,000, 279 Arthur street, for W. B. Sinee, Ray Court. Builder and general contractor, J. E. Jenkinson, Andrew Block. Heating, plumbing, W. B. & H. R. Sinee. Two storeys, 70 x 38, stone foundotion, frame and pressed brick construction.

Regina, Sask.

Business block, cost $35,000, 11th Ave. and Alberta street, for R. A. Carman, Western Trust Building. Architects, Brown & Vallance, 1006 McArthur Building, Winnipeg. General contractor, R. J. Lecky, Northern Block, Scarth street. Two storeys, 97 x 108, 8 stores on ground floor, offices above, brick construction, Red Cliff brick.

Warehouse, cost $150,000, for The John Deere Plow Co., Albert and South Railway street. General contractors, Carter-Halls-Aldinger Co., Ltd., 1010 Union Bank Building, Winnipeg, Man. Five storeys and basement, 113x 125, cement foundation, brick construction.

Two stores, dance hall and pool room, cost $12,000. Architects and general contractors, Kleisinger Bros., Ottawa street. One storey, 70 x 125, brick foundation, frame construction.

Saskatoon, Sask.

Office building. Six storeys, 23rd street and 2nd avenue, planned for a syndicote. Managing director, Mr Hammond. General contractor, G. N. Hughes.

South Edmonton, Alta.

Store and office, cost $15,00, for C. Gallagher. Architect and general contractor, John Guyll. Three storeys, 45 x 48, cement foundation, brick construction. Excavation finished.

Store, cost, $4,000, 5th avenue east. Architect and general contractor, T. Chadifaux, Beaumont. Two storeys, 40 x 52, frame, cement foundation.

Store, cost $5,000, 6th avenue southeast. Architect and general contractor, G. Siegel & H. D. Bloez. Two storeys, 30 x 40, frame, brick foundation. Excavation finished.

Toronto, Ont.

Four attached stores, cost $10,000, Dundas. Owner and builder, M. Shunkman, 205 Markham. Two storeys, 60 x 46, brick construction and foundation.

Two attached stores, cost $5,000, Gerrard street east. Owner and builder, J. A. Gallagher, Broadview and Langley avenues. Three storeys, 30 x 46, brick foundation, brick construction.

Office building, cost $80,000, Simcoe and Richmond, for Goodyear Tire & Rubber Co., 85 Queen street east. Six storeys, brick, terra cotta and mill construction. General contractors, Gay & Sons, Oshawa, Ont. Masons Colwell & Youde, 208 Lumsden Building. Contract for painting, heating, plumbing, electrical and interior fittings not yet awarded. See J. A. Carter at Simcoe and Richmond streets.

Vancouver, B.C.

Plant, cost $35,000, False Creek, for The Columbia Block & Tool Co., 601 Powell street. Architect, T. H. Bamforth, 319 Pender street west. General contractor, H. Peterson, 1905 Quebec street. Machine shop, dock, 100 x 110, and a 90-ton lift travelling crane to operate on a 175 ft. runway.

Winnipeg, Man.

Warehouse, cost $5,000, for J. H. Mussons. Architect and general contractor, Claydon Bros., Furby Place. One sty., 67 x 85, metal clad. Excavation started.

Residences

Dunnville, Ont.

Residence, cost $10,000, Cedar and Alder, for W. J. Aikens. Tenders received by Architect, L. D. Barber, Temple Building, Brantford, until March 8th. Stone and cement foundation, cut stone and brick construction. Three storeys, 36 x 40.

Gananoque, Ont.

Residence, cost $4,500, for W. T. Sampson. Architect, A. S. Allaster, Brockville. 2½ storeys, 34 x 62, structural steel, pressed brick artificial stone construction, stone foundation. Plans drawn.

Lambeth, Ont.

Residence, cost $4,500, contemplated for A. E. Somerville, c/o Rex Cigar Co., Dundas street. Architect not yet chosen. Two storeys, cement foundation, pressed and white brick construction.

Leamington, Ont.

Residence, cost $4,000, for Miss Von Kaenal, c/o Mrs. McLean, Main street. Two storeys, cement foundation, white brick construction. Plans in progress.

London, Ont.

Residence, cost $6,000, contemplated for Police Magistrate J. C. Judd, Ridout street and West avenue. Architect not yet chosen. Two storeys, stone and cement foundation, pressed brick construction.

Residence, cost $6,000, William street, for J. Dawson, Keenleyside, c/o Robinson Little Co., London. Architect not yet chosen. Two storeys, stone and cement foundation, pressed brick construction.

Montreal, Que.

Apartment house, cost $500,000, Westmount, Cote des Neiges road, for James H. Maher, Transportation Building, Montreal. Architects, Saxe & Archibald, 59 Beaver Hall Hiil, Montreal. Cement foundation, stone, reinforced construction, structural steel and brick construction. Plans in progress.

Eight flats, cost $10,000, Dorlet, for Alderic Jolicoeur, 468 Fabre. Three storeys, 100 x 40, cement foundation, pressed brick construction, felt and gravel roofing. Plans drawn.

Four residences, cost $22,000, for L. P. Forest, 817 St. Joseph Boulevard. Tenders received by Architect, A. G. Noseworthy, 41, New Birks Building, after March 1st. Two storeys, 50 x 100, cement foundation, pressed brick construction.

Notre Dame Des Victoires, Que.

Residence, cost $200,000, for Parish Priest. Architects, Viau & Venne, 76 St. Gabriel street, Montreal. Tenders received by Architect until March 10th. 2½ storeys, pressed brick construction, cement foundation.

Ottawa, Ont.

Residence, cost $6,000, for W. H. Walker, 482 Cooper. Architect, W. Herbert George, Castle Building, Queen St. Stone foundation, brick veneer construction. Plans in progress.

Residence, cost $8,000, for B. Campsen, Concord street. Stone foundation, brick veneer construction. Plans in progress.

Princeton, B.C.
Residence, for manager, contemplated by the Bank of Montreal. Head office, Montreal. Plans will be prepared.

St. Henri, Que.
Five flats, cost $5,000, Richelieu, for D. F. Deslauriers, 1031 St. Antoine. Architect, Rene Charbonneau, 15 St. James, Montreal. Three storeys, 30 x 54, cement foundation, brick construction, felt and gravel roofing. Plans drawn.

South Edmonton, Alta.
Residence, cost $5,000, 2nd avenue north and 5th street east, for W. Lowes. Two storeys, 26 x 28, cement foundation, frame construction. Plans drawn.

Toronto, Ont.
One detached and 2 attached residences, cost $15,000, Pacific avenue, for Dr. Walter Scott, 1002 Queen street west. Architects, Designing & Draughting Co., 36 Toronto street. Two stys., 2 attached 33 x 40, 1 detached 17 x40, cement foundation, brick construction. Plans drawn.

One pair residences, cost $6,000, Pembroke street, for T. H. & J. Bishop, 48 Playter Crescent. Architect, J. G. Hedges, 210 Clinton street. 2½-stys., 50 x 46, stone foundation, brick construction. Plans drawn.

One pair and 1 detached residences, cost $9,000, George street, for H. B. Rusor, 7 Summerhill ovenue. Architect, J. H. Stanford, Bloor and Ossington avenue. 2½-storeys, 17 x 57 single, 30 x 57 pair, stone and brick construction. Plans drawn.

Two residences, cost $6,000, Pembroke, for T. H. & J. Bishop, 48 Playter Crescent. Architect, J. G. Hedges, 210 Clinton street. Tenders received by owner after middle of March. 2½-stys., 50 x 46, stone foundation, brick construction.

Residence, Glen and Whitney, for J. B. Hutchins, care architect. Tenders now being received by Architects, Page & Warrington, 304 Confederation Life. 2½-storeys, 60 x 50, brick foundation and construction, concrete.

Victoria, B.C.
Residence, cost $50,000, Uplands, for Andrew Wright, 1006 St. Charles street. Architect, Philip M. Julien, 313 Arts and Crafts Building, Vancouver, will receive tenders for all work and material. Former General Contractor tenders were rejected.

Weston, Ont.
Two residences, cost $5,000 each, for John Watson, King street. Plans in progress. Work will start as soon as weather permits.

Windsor, Ont.
Residence, cost $5,000, River Front, for W. Leitch, Ford street. Tenders received by Architects, Crane & Pennington, [illegible] Building, from March 1st to 10th. Two storeys, 30 x [illegible], brick [illegible] stone construction, hollow tile foundation.

Winnipeg, Man.
Residence, cost $[illegible],000, [illegible] street, for J. L. Lidholm, [illegible] Aubrey. Architect, E. D. Tuttle, 701 McArthur street. Three storeys, stone foundation, brick construction. Plans in progress.

Eight residences, cost $14,400, Berry and St. James streets, for Donald Sutherland, 334 Lipton street. One sty., 20 x 30, stone foundation, frame construction. Plans in progress.

CONTRACTS AWARDED

Calgary, Alta.
Residence, cost $4,000, 15th avenue west, for G. H. Page, Beveridge Block. General contractor, W. W. Duncan, 820 8th ovenue west. Cement foundation, frame construction. Excavating done.

Residence, cost $4,000, Mt. Royal. Architect and builder, R. W. Peach, 2622 15th street west. Two storeys, 25 x32, cement foundation, tile construction. Excavating started.

Edmonton, Alta.
Rooming house and store, cost $8,000. Architects and general contractors, Crisp, Poole, Morton, 1501 Alberta Ave. Three storeys, 55 x 60, frame, brick foundation. Excavating started.

Macleod, Alta.
Residence, for W. Stevens. General contractor, J. S. Lambert. 1½-storeys, 24 x 34, cement foundation, frame construction.

Montreal, Que.
Five flats, cost $4,500, Darling Ave. Owner and builder, Donat Asselin, 1765 St. Catherine street east. Three stys., 30 x 44, pressed brick construction, cement foundation, felt and gravel roofing.

Five flats, cost $7,000, Rosemount, 6th avenue. Owner and builder, Harmidas Cantin, 337 Wolfe avenue. Three stys., 50 x 78, brick construction, cement foundation, felt and gravel roofing.

Ottawa, Ont.
Residence, cost $5,000. Owner and builder, Jas. C. Wilson, 43 Bayswater. 32 x 46, stone foundation, double brick veneer construction.

Point Grey, B.C.
Residence, cost $8,000, Laurier Ave., for J. W. Kerr. Architects, Twizell & Twizell, 837 Hastings street west, Vancouver. General contractors, Bailey & Scott, 1332 Woodland Drive. Two stys., frame construction.

Preston, Ont.
Parsonage, cost $4,500, for Lutheran Congregation. Chairman Com., Geo. A. Clare. General contractors, Wirsching Bros., Duke street. 1½-stys., white brick construction.

Prince Albert, Sask.
Residences, cost $10,000, for The Great West Wood & Chemical Co. Managing director, Felix Frank. Architect, A. Sidforth. General contractor, W. J. Wright. Electrical, The Prince Albert Electrical Co. 30 x 30, cement foundation, frame construction.

South Edmonton, Alta.
Residence, cost $[illegible]. Architect and general contractor, Lewis Ordge. Two storeys, [illegible], cement foundation, frame construction. Work to be done by day labor. Excavation done.

Residence, cost $[illegible], [illegible] avenue north and 7th street west. Architects and general contractors, [illegible]

over, 251 Jasper avenue west. Two storeys, 26 x 30, frame, brick foundation.

South London, Ont.
Two residences, cost $3,200, Wellington street. Owner and builder, W. H. Thornton, Bradford, Ont. Two stys., cement foundation, white brick construction.

Toronto, Ont.
Two detached residences, cost $7,000, Spadina road and Heath. Owner and builder, A. J. Heynes, 104 Alexander. 2½-storeys, 25 x 36, brick construction and foundation.

Residence, cost $3,000, Symington avenue, for J. W. Lewis, Symington and Antler. Builders, Hedley & Bradford, 99 Caledonia. Two storeys, 19 x 48 stone foundation, brick construction.

Residence, cost $17,000, Lyndhurst, for R. C. Matthews, 199 Yonge street. Architects, Eden Smith & Son, 199 Yonge street. General contractor, M. E. McGregor, Geoffrey. 2½ storeys, 32 x 56, brick foundation, structural steel and brick construction.

Winnipeg, Man.
Apartment, block, cost $100,000, for G. E. Baldry, Builders' Exchange Bldg. Gentral contractor, The Baldry Engineering Co., Builders' Exchange. Painting, A. Steen, 537 Stiles street. Heating and plumbing, Wm. Toole, 489 Ross ovenue. Electrical, J. C. McKinnon, 51 Adeloid street. Interior fittings, General Contractor. Trree storeys and basement, 47 x 120, concrete foundation, pressed brick and reinforced concrete construction.

Apartments, cost $50,000, Sargent St., for H. Lindal, c/o architect. L. King, Waldor Apartments. Mason, L. J. Hallgrimson, 548 Agness street. Three stys., cement foundation, brick construction.

Residence, cost $5,000. Architect and general contractor, Donald Sutherland, 334 Lipton street. Two storeys, 24 x 28, stone foundation, frame construction.

Ten residences, cost $25,000. Architect and general contractor, M. Dorfman, 373 Stella avenue. Two storeys, 22 x 26, stone foundation, frame construction. Excavating started.

Power Plants, Electricity and Telephones

Brockville, Ont.
Telephone exchange for Bell Telephone Co. Head office Notre Dame and St. Johns streets, Montreal. Architect, W. J. Carmichael, Bell Telephone Building, Montreal. Tenders received by Architect after March 1st. Brick construction

Carrillon, Que.
Installation of plant, cost $10,000,000, planned by National [illegible] Pres., Henry Miles, 4 St. Lawrence Boulevard, Montreal. Sec., Louis Gosselin, 58 Liv. Lon. and Globe Building, Montreal. New plant to develop 160,000 h.p. Present small plant of 500 h.p [illegible]

Duncans, B.C.
Electrical apparatus required by the town council. Water turbines, generators, exciters, transformers and switching equipment. Engineer, [illegible]

(Continued on page [illegible])

Tenders and For Sale Department

Extension of Time

CONCRETE BRIDGES

[illegible] Saturday, [illegible] Clerk, Colum[illegible] eleven reinforced concrete bridges in the Township of East Whitby. [illegible] apply to the un[illegible]

H. GIFFORD, Esq., Reeve,
Cedarvale, Ont.
BOWMAN & CONNOR, Civil Engineers,
36 Toronto St., Toronto, Ont.
8-9-10

CITY OF SASKATOON

Tenders for Pavements

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Pavement," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of [illegible] pavement, and 12,800 lineal feet of Concrete Gutter.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, [illegible]

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, Sask., February 21st, 1913.
9-10-11-12

Canadian Pacific Railway Co.

Department of Natural Resources

Tenders for

Concrete Paving

Sealed tenders addressed to the undersigned and endorsed "Tender for Concrete Paving," will be received up to noon of **March 29th, 1913**, The work to be let is the construction of a Concrete Paving on the Dams of Lake Newell Reservoir, and amounts to about 11,200 cubic yards of concrete paving and 8,700 cubic yards of gravel base. Construction materials, except forms, and water for concrete, will be supplied by the company. All labor, plant, and materials for forms must be furnished by the contractor.

Plans and specifications and all information may be obtained on application to the undersigned. A deposit of $25 will be required as a guarantee of good faith before plans, etc., will be given out, which will be refunded on the receipt of a bona-fide tender.

All proposals must be accompanied by a certified cheque payable to the undersigned for $5,000, which will be forfeited as liquidated damages should the bidder refuse or neglect to execute the contract to construct the work if awarded to him. Proposals must be made in the form provided. Any alterations thereto, interlineation or qualifying of prices may invalidate the bid.

The right is reserved to reject any or all bids and to waive defects.

A. S. DAWSON, Chief Engineer.
Calgary, Alta., Feb. 14, 1913. 8-9-10

Town of North Battleford

Province of Saskatchewan

Water Works, Sewerage Works, and Concrete Sidewalks

Sealed tenders will be received by the Secretary-treasurer of the Town of North Battleford, until 8 p.m., **Tuesday, April 15th, 1913**, for the following works:

Contract A.—Pipelaying on Waterworks and Sewers.
Contract B. Furnishing Cast Iron and Steel Water Pipes and Specials.
Contract E.—Fire Hydrants and Gate Valves.
Contract S.—Furnishing Vitrified Tile Sewer Pipe and Junctions.
Contract T.—Constructing Concrete Sidewalks and Curbs.

Plans and specifications may be seen at the office of the Engineers, Toronto and Winnipeg, and at the Town Hall, North Battleford, on and after March 17th, 1913.

Lowest or any tender not necessarily accepted.

D. S. WALKER, Esq., Mayor,
North Battleford, Sask.
H. W. DIXON, Esq., Secretary-treas.,
North Battleford, Sask.
CHIPMAN & POWER, Con. Engineers,
9-10 Toronto and Winnipeg.

Town of Swift Current, Sask.

Tenders for

Cast Iron Pipe and Specials

or

Alternatively Steel Pipe and Specials

The Town Council of the Town of Swift Current are prepared to receive tenders for the supply of the following material:—

Cast Iron or Steel	Tons C.I.	Lin. Feet.
6-in. diam.	141	8566
8-in. diam.	50	2230
10-in. diam.	160	5346
12-in. diam.	249	6214
Totals	600	22356

Cast Iron Pipe Specials, approximately 7 tons, or about 100 pieces.

Specifications and forms of tender may be had on application to the undersigned.

Tenders endorsed "Cast Iron Pipe," or "Steel Pipe," to be lodged with the Secretary-Treasurer not later than noon of **Monday, the 17th of March, 1913.**

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

CITY OF SASKATOON

Tenders for

Concrete Sidewalks

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Concrete Sidewalks," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of approximately:

265,390	square feet of	Concrete Walk.
5,700	square feet of	Lane Crossings.
28,760	lineal feet of	Separate Curb.
22,050	lineal feet of	Combined Curb.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

CITY OF BRANTFORD

Tenders for Sewer Pipe

Sealed tenders addressed to Ald. Sam. Suddaby, Chairman of the Board of Works, in care of the City Clerk, Brantford, Ont., will be received till 12 o'clock noon on **Thursday, March 13th, 1913**, for the supply of Sewer Pipe required by the City of Brantford during 1913.

Specifications may be seen and instructions to bidders and forms of tender obtained on application to the City Engineer.

Each tender must be accompanied by a marked cheque payable to the order of the City Treasurer for the amount called for in the form of tender.

The lowest or any tender not necessarily accepted.

T. HARRY JONES,
City Engineer.
City Hall, Brantford, Ont.,
February 24th, 1913. 9-10

Town of Swift Current, Sask.

Tender for

Sinking Gas Well

The Town Council of the Town of Swift Current are prepared to receive tenders for the sinking of a Gas Well approximately 2,000 feet in depth.

Specifications and forms of tender may be had on application to the undersigned.

A deposit of Ten Dollars ($10) will be required for each copy of the specifications, which will be returned on receipt of a bona fide tender.

Tenders endorsed "Gas Well" and accompanied by a marked cheque for $2,000 to be lodged with the Secretary-Treasurer not later than noon of **Monday, the 17th of March, 1913.**

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.
Swift Current, Sask.,
February 12th, 1913. 8-10

Notice

Postponment of Tenders

City of Regina, Sask.

Regina Municipal Railway

Tenders for the following have been idefinitely postponed:—

Contract "K"

40,000 square yards track paving with top finish and sub-base.

By order

R. MARTIN, Mayor,
G. A. MANTLE,
L. A. THORNTON,
City Commissioners

9-10

Town of Welland

Tenders for Sidewalks

1913

Tenders are invited for the construction of concrete sidewalks for the present year, the quantity being estimated at about three miles.

Specification and schedules can be seen at the office of Contract Record & Engineering Review, Toronto, and Town Engineer's office, where any other information may be received.

Sealed tenders, fully endorsed, are to be deposited with the Town Clerk, Town Hall, not later than **March 15th**, at 12 noon.

An accepted bank cheque for $700 must accompany each bid. Cheques will be returned to unsuccessful tenderers.

The lowest or any tender not necessarily accepted.

GEORGE R. BOYD, Town Clerk,
H. L. HATT, Chairman,
R. and B. Committee.

9-10

Department of the Naval Service

Sealed tenders addressed to the undersigned, and endorsed "Tender for the Erection of an Operating House (Type No. 3) in connection with a Wireless Telegraph Station at Port Arthur, Ontario," will be received at this office until noon on **Saturday, March 15th, 1913**.

Plans, specifications, and forms of contract to be entered into, can be seen on and after the 25th inst, at the Office of the Superintendent Radio-Telegraph Branch, Department of the Naval Service, Ottawa, or at the Government Wireless Telegraph Station Dawson street, Port Arthur, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted [illegible] the order of the Honorable the Minister of the Naval Service, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department [illegible] the lowest or any tender.

By order,

G. J. DESBARATS,
[illegible]

Department of the Naval Service,
36126 [illegible] 15, 1913 9-10

CITY OF SASKATOON

Tenders for Labor on Storm Sewers

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Labor on Storm Sewers," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the laying of approximately 6,525 lineal feet of Storm Sewer; 2,100 lineal feet of Catch Basin Connections, and the construction of Manholes, Catchbasins and Appurtenances.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

Town of Swift Current, Sask.

Tenders for

Gate Valves, Valve Boxes, and Fire Hydrants

The Town Council of the Town of Swift Current are prepared to receive tenders for the supply of the following material:—

37—6-in. Valves and Boxes, 3—8-in. do, 3—10 in. do, 3-–12-in. do.

22—6-in. Fire Hydrants.

Specifications and forms of tender may be had on application to the undersigned.

Tenders endorsed "Valves and Hydrants," to be lodged with the Secretary-Treasurer not later than noon of **Monday the 17th of March, 1913.**

The lowest or any tender not necessarily accepted.

GEORGE D. MACKIE,
Town Engineer.

Swift Current, Sask.,
February 12th, 1913. 8-10

Tenders for Supplies

Sealed tenders, registered and clearly marked on the outside of envelope, "Tenders for Electrical Department Supplies," and addressed to the City Commissioners, Regina, Saskatchewan, will be received up until noon of **March 29th, 1913**, for the supply of:

Section No. 1. Weatherproof copper [illegible]
Section No. 2. Western cedar poles.
Section No. 3. Cross-arms.
Section No. 4. Top-pins, insulators, etc.
Section No. 5. Pole line hardware.
Section No. 6. Pole type transformers.
Section No. 7. Integrating watt meters, single, [illegible]
[illegible] tion equipment.
[illegible] arc lights.
Section No. 10. Underground material.
Section No. 11. Fire alarm boxes and gongs.
[illegible] Regina.

[illegible] gina, Sask.

[illegible] cent.) of bid must accompany each tender.

[illegible] reject any or all tenders.

F. W. BULL,

[illegible]

Town of Swift Current, Sask.

Tenders for Electrical Machinery

Sealed tenders, endorsed "Tenders for Electrical Machinery," and addressed to the Secretary-Treasurer, Swift Current, Sask., will be received up to noon of the **31st of March, 1913**, for the supply of one two hundred kw. and one four hundred kw. alternating current generators, direct connected to high speed vertical engines or horizontal turbines, complete with all accessories.

Copies of specifications may be obtained from the undersigned.

A marked cheque for five per cent. of the amount of the tender must accompany each bid.

The lowest or any tender not necessarily accepted.

GEO. D. MacKIE, Town Engineer.

10-12

County of Haldimand

Road Superintendent

Applications will be received up to and including the **8th of March** for the position of Road Superintendent for the above County. Schedule of the duties may be had on application to the County Clerk, Cayuga.

Applications must be in the handwriting of the applicant, must be sealed and endorsed on the outside "Application" and be addressed to the undersigned.

Applicants should state clearly their experience on road work, their age, whether teetotal or moderate, when ready to assume position, and salary expected, which shall include travelling expenses.

Not more than three names should be given of persons acquainted with the applicant to whom Committee may apply for information.

WILLIAM WALTON,
Chairman County Roads Committee,
Cayuga, Ont.

8-10

Sealed tenders addressed to the undersigned, and endorsed "Tender for Customs Building, Ottawa, Ont.," will be received until 4 p.m. on **Monday, March 31, 1913**, for the construction of a Customs Building on Mackenzie Avenue, Ottawa, Ont.

[illegible] be seen and forms of tender obtained at this Department and at the offices of R. L. Deschamps, Esq., 103 St. Francois Xavier Street, Montreal, and of Thos. Hastings, Esq., Clerk of Works, Postal Station "F," Yonge street, Toronto, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

[illegible] cepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, [illegible] and dollars ($75,000), which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

[illegible]

R. C. DESROCHERS,
Secretary

Department of Public Works,
[illegible]

Newspapers will not be paid for this advertisement if they insert it without authority from [illegible]

City of Moose Jaw, Sask.

TENDERS FOR
Boiler Room Equipment

[illegible] Wednesday, March 26th 1913 [illegible]

[illegible] 7000 [illegible] heat [illegible]

[illegible] 120,000 [illegible]

[illegible] by a marked [illegible] cash deposit equal to at least five per [illegible]

[illegible] upon application to J. D. Peters, Electrical Superin[illegible]

[illegible] necessarily [illegible]

[illegible]
L. W. RUNDLETT,
[illegible] City Commissioners.
[illegible] 1913. 10-12

Canadian Pacific Railway Company

North Toronto Grade Separation

Notice to Contractors

Sealed proposals will be received by the undersigned up to 12 o'clock noon on **Thursday, March 20**, for the construction of the substructures of subways at Davenport Road, Spadina Road, Howland avenue, and Bathurst street, at North Toronto.

Plans and specifications can be seen at the office of the Engineer of Grade Separation at No. 262 Avenue Road, where proposal forms can also be obtained.

The lowest or any tender not necessarily accepted.

B. RIPLEY,
Engineer of Grade Separation.
Toronto, February 20th, 1913. 9-10

HALIFAX, N. S.

Water Works

Sealed tenders addressed to the Mayor for the construction of a Reinforced Concrete Reservoir and Gate House will be received at the office of the Committee on Works of the City of Halifax, N.S., until noon on **Wednesday, April 2, 1913**.

Each tender must be accompanied by a properly certified cheque for the sum of one thousand dollars, payable to the order of the City Treasurer of the City of Halifax, said cheque to be returned to the bidder unless he fails to execute the contract should it be awarded to him, within ten days of such award.

A bond in the sum of ten thousand dollars with two approved sureties or with an approved Surety Company as surety, will be required for the faithful performance of the contract.

Notice to contractors, form of tender, contract, specifications and bond can be obtained, and plans can be seen at the office of the City Engineer.

The City reserves the right to reject any or all tenders should it deem it advisable to do so, and reserves the right to award the contract as it deems best.

J. J. HOPEWELL,
10-12 Clerk of Works

Tenders Wanted

Sealed tenders, marked on envelope "Tender for School Building," and addressed to the undersigned, will be received up to **Wednesday, March 19th**, at six o'clock p.m., for the erection of an addition to the Woodstock Collegiate Institute.

Plans, specifications and any other information required may be had at the office of the architect. The lowest or any tender not necessarily accepted.

B. McNICHOL, Architect
Woodstock, Ont.
March 1st, 1913. 10-11

CITY OF CALGARY

Tenders for Vacuum Street Cleaner

Notice is hereby given that the time for the receipt of tenders for the supply of Vacuum Street Cleaners for the City of Calgary has been extended until five o'clock p.m. on **Monday, March 10th, 1913.**

For full particulars as to specifications and requirements, apply to Mr. W. H. Cuddie, Superintendent of Street Cleaning, Calgary, Alberta, Canada.

J. M. MILLER, City Clerk.
Calgary, Alberta, Canada,
February 25th, 1913. 10

Tenders for Concrete Abutments

Sealed tenders, plainly marked as to contents, will be received by S. K. Ewart, Chairman of Committee, Chesley, Ont., up to six o'clock p.m. of **Monday, March 17th, 1913**, for the construction of concrete abutments with piled foundations, and concrete floor for a steel bridge over the Saugeen River, between the Townships of Brant and Elderslie, County of Bruce.

Plans and specifications are in the hands of S. K. Ewart, Esq., Chesley, Ont., and P. A. Malcolmson, Kincardine, Ont., or they may be seen at the office of the undersigned, 57 Adelaide street east, Toronto.

The lowest or any tender not necessarily accepted.

FRANK BARBER, Engineer.
Toronto, Ont.
February 28, 1913 10

Tenders Wanted

Public School Board

Edmonton

Sealed tenders will be received by the undersigned up to **Thursday, March 20th, 1913**, for the erection of a sixteen room brick school on Block Seven, Hudson Bay Reserve.

Tenders must be accompanied by a certified cheque for five per cent. of tender.

Plans and specifications may be obtained at the Public School Board, Edmonton, Alta.

The lowest or any tender not necessarily accepted.

Edmonton Public School Board,
10-11 Edmonton, Alta.

For Sale

Twin Cylinder Compound Steam Pump (11 x 18 x 15 x 15). Apply The W. L. & H. Board, St. Mary's, Ont. 10

Board of Education

Sealed tenders, whole or separate, addressed to the Secretary-Treasurer of the Board, will be received until

FRIDAY NOON, MARCH 14th, 1913

for the several trades required in the erection of

Enlargement of Riverdale High School

Specifications may be seen and all information obtained at the office of the Superintendent of Buildings, City Hall. Each tender must be accompanied with an accepted bank cheque for 5 per cent. of the amount of tender or its equivalent in cash. Tenders must be in the hands of the Secretary-Treasurer, at his office in the City Hall, not later than 12 o'clock noon on the day named, after which no tender will be received. The lowest or any tender will not necessarily be accepted.

W. O. McTAGGART,
Chairman of Committee.

W. C. WILKINSON,
10 Secretary-Treasurer.

CITY OF SASKATOON

Tenders for Material for Water Connections

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Material for Water Connections," will be received up to 12 o'clock noon on **Friday, March 21st, 1913**, for the following material:—

(a) Lead Pipe and Galvanized Iron Pipe.
5,000 lin. ft. of 2-in. galvanized iron pipe.
2,000 lin. ft. of 1-in. galvanized iron pipe.
15,000 lbs. ¾-in. lead pipe.
10,000 lbs. 1-in. lead pipe.
(b) Waterworks Brass Goods.
60—2-in. curb cocks iron to iron similar to Mueller D-6164.
600—¾-in. curb cocks lead to lead, similar to Mueller D-5354.
500—¾-in. main cocks, similar to Mueller D-5051.
300 1-in. main cocks, similar to Mueller D-5051.
100—¾-in. lead to lead unions, similar to Mueller D-5001.
600—¾-in. lead to iron unions, similar to Mueller D-5002.
160—1-in. lead to iron unions, similar to Mueller D-5002.
48—4-way branches, similar to Mueller D-5103 without goose necks and main cocks.
(c) 1,100 Service Boxes Complete.
(d) 1,000—⅝-in. Meters.
10—1½-in. Meters.
20—2-in. Meters.
2—3-in. Meters.

The Corporation reserves the right to divide the work into four contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

Each tender must be accompanied by a marked cheque equal to ten per cent. of contract price.

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, Sask.
February 25th, 1913. 10

Wanted

One good second-hand stone crusher, complete; in good working order. Address Box 655, Belleville, Ont. 10-T.F.

TENDERS

Tenders will be received at the London office of the undersigned, up till 12 o'clock noon, Wednesday, **March 17, 1913**, for the erection and completion of the new plant for the McCormick Manufacturing Company, London, Ont.

Plans may be seen at both the London and Hamilton offices.

The lowest or any tender not necessarily accepted.

Watt & Blackwell,
10 **Architects**

Tenders for
Sewage Pumps

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on Tuesday, **March 18th, 1913**, for:

Sewage Pumps with Motors and Automatic Starting Devices

Specifications and tender forms may be obtained upon application at the office of the Sewer Section, Department of Works, City Hall, Toronto.

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as prescribed by city by-law must be strictly complied with or the tenders will be declared informal.

Tenderers shall submit with their tenders the names of two personal sureties approved of by the City Treasurer, or in lieu thereof, the bond of a guarantee company, approved of as aforesaid.

The lowest or any tender not necessarily accepted.

H. C. HOCKEN, Mayor,
Chairman, Board of Control.

City Hall, Toronto,
February 25th, 1913. 10

For Sale

Dredge and Derrick and Tug, Portable Crusher, and 20 horse power Boiler and Engine, 12-ton Case Roller, "steam steerer," 19 Dump Waggons, Wheel and Drag Scrapers, Shovels, Hammers and Picks. All in good working order and cheap. Apply to H. A. Camjaigne, Niagara House, Niagara Falls, Ont. 10-T.F.

For Sale

[illegible] ment:—

One 35-foot boom derrick.
Four Smith concrete mixers.
Three hoisting engines.

[illegible] etc. Apply Bishop Construction Co., Ltd., Sterling Road. Telephone Jct. 2946. 10

McMyler Derricks For Sale

Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover buckets, two (2) marine engines, boilers, fuel

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

Special Notice to Contractors

Could supply you with any quantity of

Relaying Rails or for Reinforcing Concrete

at a very low price, B. Shragge Iron & Metal Company, 396 Princess Street, Corner King; Telephone St. John 382, Winnipeg. 11-t.f

Bush Horses
For Sale

Eight or ten teams good heavy bush horses to be disposed of about the middle of March. Now working at Mowat, on the Canadian Northern [illegible]

[illegible]
501 Kent Bldg., [illegible]
[illegible] 9-10

Situations Vacant

WANTED—Superintendent for construction work, tracklaying, ballasting, etc. Must be first-class man with unexceptional references. Ad- [illegible] 9-11

Situations Wanted

[illegible] boss, concrete work; concrete and carpenter foremen; cost clerks; fifty good form carpenters wanted. Applications must give detailed experience, references, recommendations, etc. Long time job and best pay. Apply A. M. Crain, Box 193, Bassano, Alta. 9-11

Contractor's Diver disengaged; requires situation. Have good references. Accustomed to all kinds of pier work, intake and outfall. J. Sweeney, 157 La Salle Avenue, Maisonneuve, P.O. 9-11

[illegible] 27 [illegible] senting good contracting, mining or industrial company in West Indies or Mexico. Two years experience in Mexico. Best of references. Box 713, Contract Record, Toronto, Ont. 8-11

(Continued from page 73)

Power Plants, Electricity and Telephones

[illegible] & Co., 450 Granville street. Specifications at offices of Engineer and clerk. Tenders received by Clerk, Jas. Green, until March 14th.

Dundas, Ont.
The Water, Light & Power Commission contemplates purchasing a synchronous motor. Chairman, R. W. Karch, Dundas Hydro-Electric System.

Edmonton, Alta.
Lighting system for bridge, being constructed between north and south Edmonton. Bridge is 30 ft. x about 2,000 ft., cost $15,000, contemplated by the city council and C. P. Rly. Clerk, F. M. C. Crosskill.

North Bay, Ont.
Telephone exchange for Bell Telephone Co. Head office, Notre Dame and St. Johns streets, Montreal. Tenders received by Architects, W. J. Carmichael, Bell Telephone Building, Montreal, after March 15.

Ottawa, Ont.
Telephone exchange, 1st avenue, for Bell Telephone Co. Head office, Notre Dame west and St. John streets, Mont-

General Manager Wanted for the City of Westmount

to give his entire time to the business management of the City. Must have proven executive ability and be competent to handle all details of the City's administration. One with intimate knowledge of Municipal questions preferred. Applications giving fullest details as to personal qualifications, business experience and salary expected, will receive prompt consideration.

Address: The Mayor, Westmount, P. Q.

[illegible] Tenders will be received by Architect, W. J. Carmichael, Belle Telephone Building, Montreal. Stone foundation, pressed brick construction.

Oak Bay, B.C.

Municipal council will prepore cost estimates on lighting by cluster lights the whole length of Oak Bay avenue within the municipal limits.

Regina, Sask.

Electrical line supplies required by City Commissioners. Sec. 1, weatherproof copper wire; 2, western cedar poles; [illegible] arms; 4, top pins, insulators, etc.; 5, pole line hardware; 6, pole type transformers; 7, integrating watt meters, single polyphase and two-rate; 8, metal flame arc lamps and station equipment; 9, series cut out mast arms for arc lights; 10, underground material; 11, fire alarm boxes and gongs. Price to be F.O.B., Regina. Specifications at office of Supt. of Light and Power, E. W. Bull. Tenders received by Commissioners until March 29th .

St. Catharines, Ont.

Telephone exchange, cost $20,000. Bell Telephone Co. Head office, Notre Dame and St. Johns streets, Montreal. Architect, W. J. Carmichael, Bell Telephone Building, Montreal. Tenders received by Architect after March 1st. Two storeys, 40 x 55, pressed brick and cut stone construction, stone foundation.

Swift Current, Sask.

Tenders received by secretary-treasurer, Geo. D. Arnott, until noon, March 31st, for one 200-kw. and one 400-kw. a.c. generators, direct connected to high speed vertical engines or horizontal turbines. Specifications at office of engineer, Geo. D. Mackie.

Miscellaneous

Elk Lake, Ont.

The town council plan to replace fire apparatus destroyed in recent fire. For further information address A. H. Porter, Reeve, James Twp. Elk Lake P.O.

Business Notes

Acton Vale, Que.

Store and residence burned. Edmond Lapointe, residence, loss $6,000. E. A. Bergeron, store, loss $8,000. Covered by insurance.

Knowlton, Que.

Knowlton Home, Lakeside road, burned. Will rebuild. Loss partly covered by insurance. For further particulars address Secretary.

Montreal, Que.

Factory of S. H. Ewing & Sons, 98-102 King street, burned. Damages $10,000. Building will be repaired at once.

Niagara Falls, Ont.

C. M. Borter, architect, is preparing plans for additions and alterations to the Guild Hall for All Saints Church, Robinson street, also for store and flat on McDougal ave. and residence on Victoria ave., for James Orr.

Ottawa, Ont.

Business block. Owned by Mrs. MacFarlane, 226 Albert street, burned. Loss $40,000, insurance $11,000. Undecided whether to rebuild.

Store and residence of A. Payne, Carleton avenue, Riverside, burned. Loss $8,000. Will rebuild. Cement foundation, brick veneer construction.

St. John, Que.

Grocery store and residence. Henri Thuot, Lemoine street, burned. Loss $5,000, partly covered by insurance, will rebuild. Scales, plate glass, show case, refrigerator required.

St. Leonard, Que., Nicolet Co.

Stores and residences burned. Owners Wil Daneault, residence $5,00; Ph. Beliveau, store and residence $15,000; Mrs. Ed. Beliveau, residence $3,000; U. Bergeron, residence $3,000; Dr. Dugre, drug store $4,000.

Wallaceburg, Ont.

Store and residence of J. A. Quennell, Nelson street, burned. Will rebuild. New equipment required for grocery store.

Winnipeg, Man.

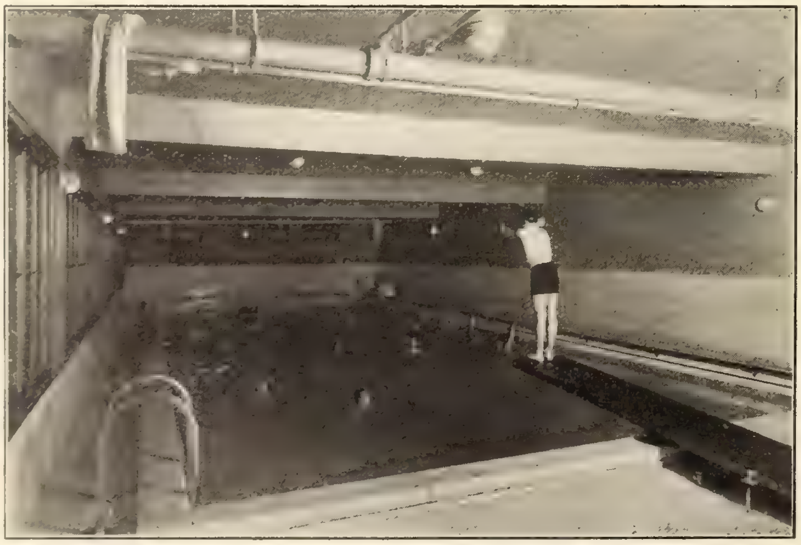
Business block, Portage avenue, owned by Sir. D. H. McMillan, 45 Hargrave street, burned. Loss to building $50,000, fully covered by insurance.

New Companies

Toronto Investments, Limited, have been incorporated with a capital of $40,000, to carry on business as a land and building company, and manufacturers and dealers in building supplies, with head office at Toronto. The Provisional directors are E. R. R. Heyland, manager, C. V. House, salesman, and J. G. Love, all of Toronto.

TOXEMENT WATERPROOFS CONCRETE

TOXEMENT readily combines with Cement and does not retard or accelerate its action, but works in perfect harmony with it.



Swimming Pool of Y. M. C. A. Building, Southbend, Ind.
All Concrete made thoroughly Waterproof with Toxement

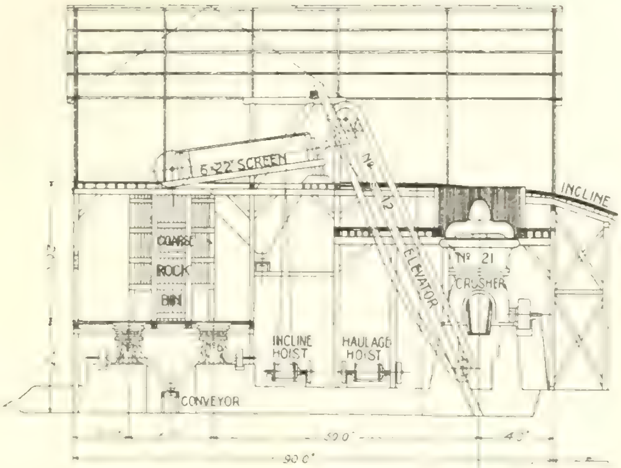
TOXEMENT BOOKLET covering the question of waterproofing and at the same time, bonding, lubricating and insulating concrete, will be sent on receipt of your business card.

R. I. W. DAMP RESISTING PAINT CO.
(TOCH BROTHERS)
Canadian Office, 201 Mail Bldg., Toronto
Toxement Carried in Stock in Principal Canadian Cities

ROCK CRUSHING PLANTS

Complete in every detail

GATES' CRUSHERS
GATES' ELEVATORS
GATES' SCREENS
LIDGERWOOD HOISTS
POWER PLANTS
DETAILED DRAWINGS



See Bulletin No. 1411

ALLIS-CHALMERS-BULLOCK
LIMITED

Works, Montreal Sales Offices, Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver

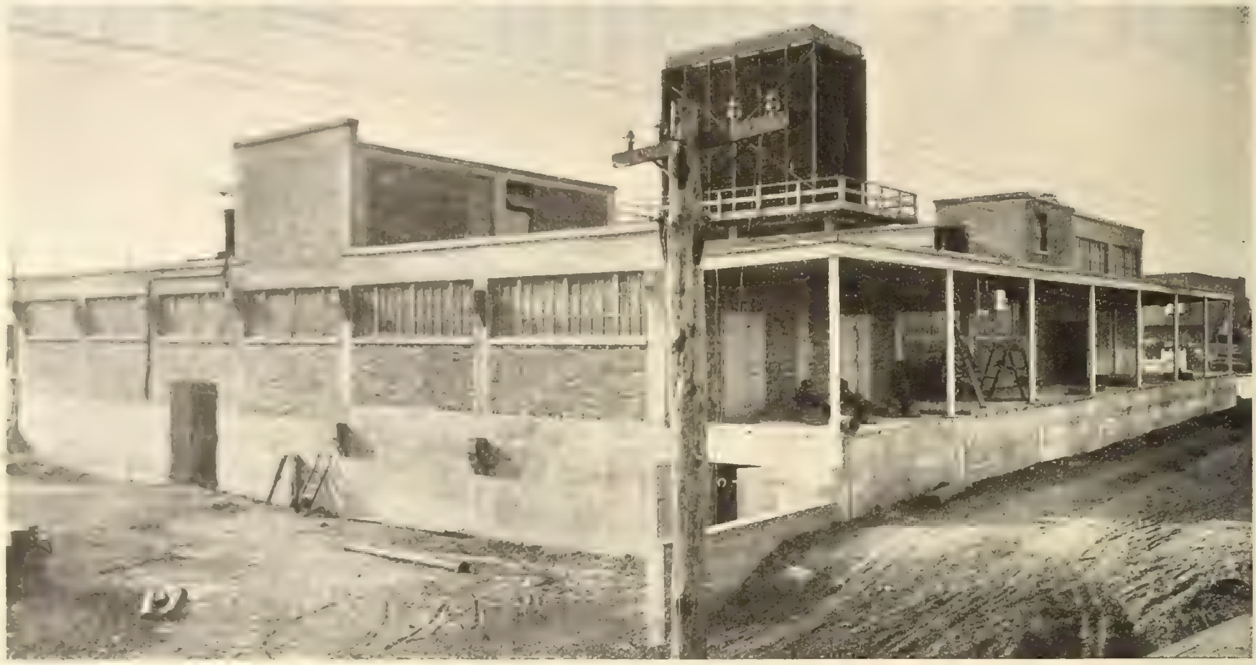
3 Way Sidewalk Prisms

Special Catalogue dealing exclusively with Daylight Buildings sent on request

GLASS of Every Description for Buildings

HOBBS MANUFACTURING CO., LIMITED

LONDON TORONTO MONTREAL WINNIPEG



Reinforced Concrete Fertilizer Building for Swift Canadian Co., West Toronto

List of our work completed in 1912

Swift Canadian Co., West Toronto

Reinforced concrete cold storage building, 152 ft. x 93 ft.—9 storeys.

Reinforced concrete fertilizer building, 112 ft. x 98 ft.—2 storeys.

Mill Construction Market building, 100 ft. x 50 ft.—3 storeys

Gunns Limited, West Toronto

Mill construction market building, 100 ft. x 50 ft.—3 storeys.

Canadian Fairbanks Morse Co., Toronto

Factory building, 400 ft. x 100 ft.—2 storeys.

Ford Motor Co., Walkerville, Ontario

Reinforced concrete factory, 507 ft. x 75 ft.—4 storeys

Boiler and gas Producer building, 60 ft. x 40 ft.—1 storey.

Heat treatment bldg. 135 ft. x 36 ft.—1 storey.

Dominion Stamping Co., Walkerville, Ontario

Reinforced concrete factory, 140 ft. x 56 ft.—5 storeys.

Engine and boiler house. 50 ft. x 30 ft.

Mr. Malcolm McGregor, Windsor, Ontario

Garage and store building, 100 ft. x 100 ft.—2 storeys and basement.

Walker Sons, Walkerville, Ont.

Reinforced concrete factory, 112 ft. x 72 ft.—3 storeys.

Canadian Detroit Lubricator Co., Walkerville, Ontario

Mill construction building, 178 ft. x 48 ft—1 storey.

¶ We refer you to any of the above-mentioned firms. We have a splendid organization and modern plant capable of handling work properly and quickly.

INFORMATION AND ESTIMATES FURNISHED ON REQUEST

WELLS & GRAY, LIMITED

Engineers and Contractors

247 Confederation Life Building **TORONTO**

$Dolarway Pavement

"It is permanent because it is concrete"

Three Fundamentals in Pavement Buying

1 First Cost: Dolarway Pavement consists of five or six inches of Portland Cement Concrete protected with a coat of Dolarway Bitumen and sand. It costs less than any other permanent pavement by over 50c. per square yard.

2 Cost of Maintenance: The maintenance of a Dolarway Pavement consists in an occasional renewal of the surface coating of Dolarway Bitumen and sand. The maximum cost of such renewals is 2c. per square yard per year. The saving in first cost is enough to provide a fund, the interest of which at 6 per cent., will maintain the pavement indefinitely.

A contractor can afford to offer Dolarway Pavement in place of any other pavement and offer the additional inducement of undertaking to keep the pavement in repair for ten years free. He will be making money at that.

3 Appearance and Satisfaction: Dolarway Pavement, being of solid concrete, maintains perfect contour. The bitumen surface is waterproof, preventing damage by frost or weather, and protecting the concrete against fracture by traffic. The surface is clean and dustless. The bitumen acts as a cushion, preventing noise and making it an easy pavement for horses.

The discovery that a cheap thin coating of the right kind of bitumen is ample to protect concrete from traffic and weather is an invention of the utmost importance and is destined to cause a revolution in paving practice. The invention dates from 1908, when the first Dolarway Pavements were laid in Ann Arbor, Mich. Since then Ann Arbor has multiplied its mileage of Dolarway year by year and many other towns and cities are following suit. **Booklets on request.**

DOLARWAY PAVING COMPANY

Whitehall Building, New York City

Dolarway Pavement, Brampton, Ont., Canada

RAILWAY CONSTRUCTION PLANT

Hoisting Engines, Horse Powers, Hand Winches, Derricks, Car Wheels, Axles and Boxes, Dump Cars, Rail Cars, Buckets

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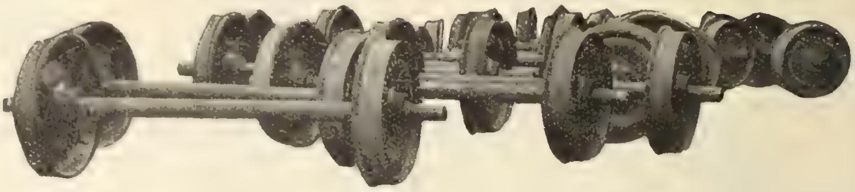

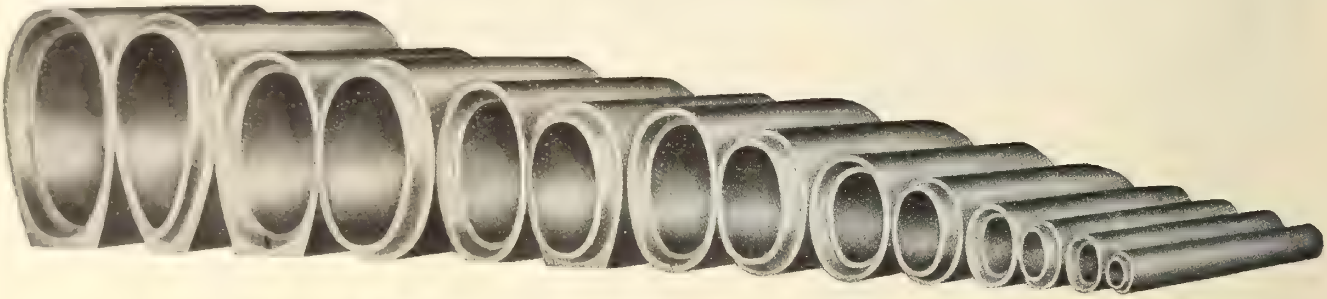

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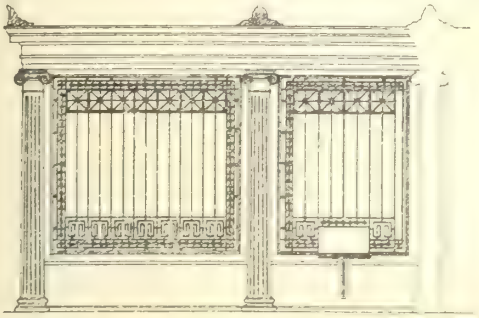

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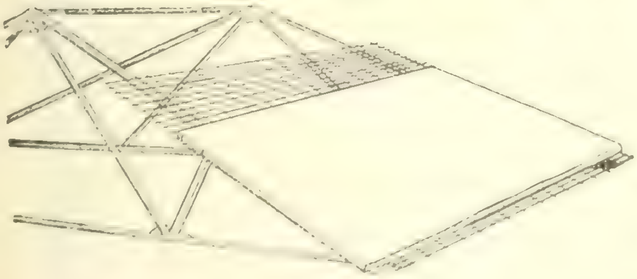

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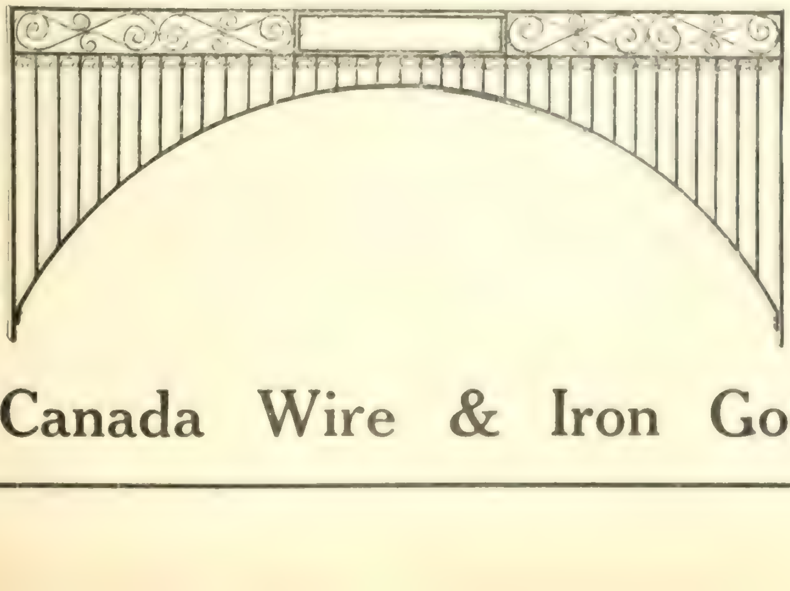

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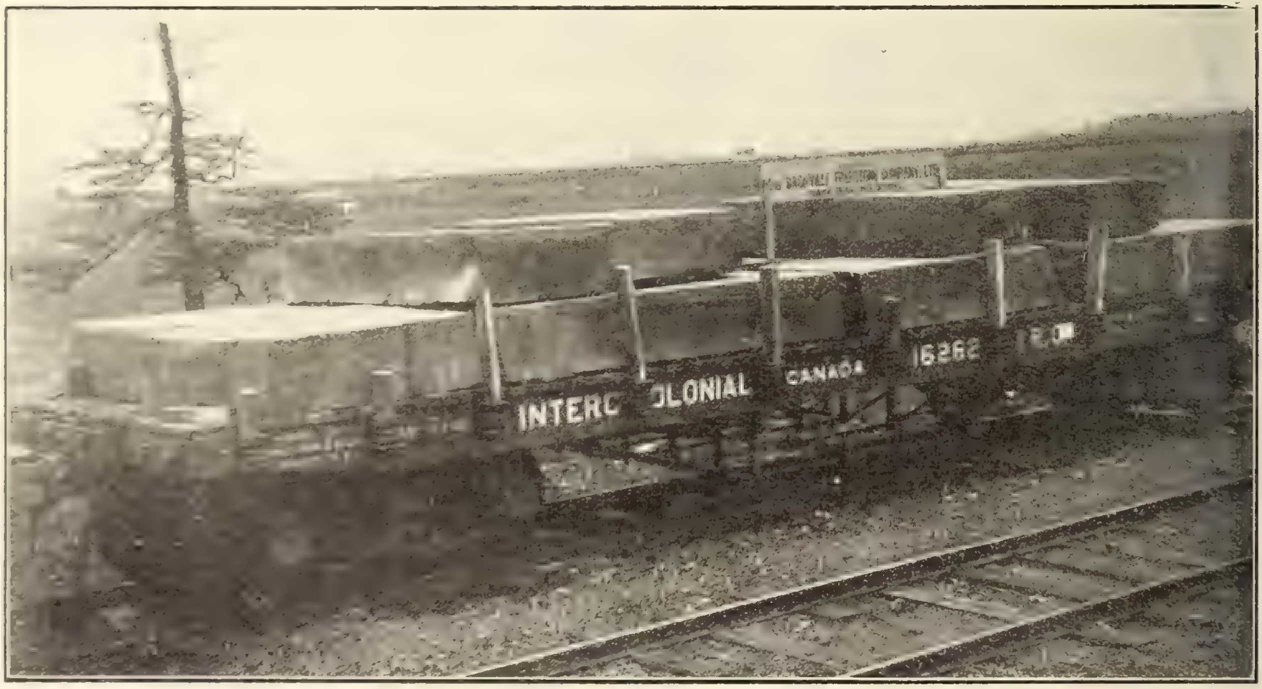

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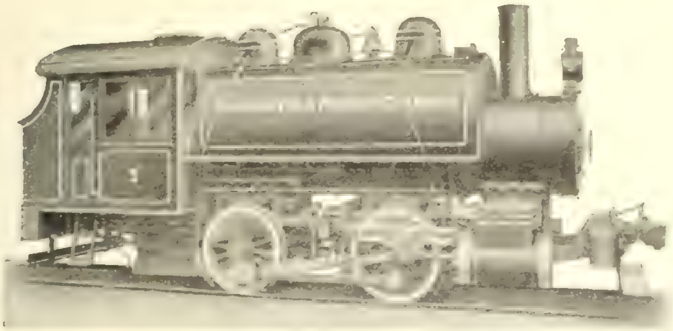

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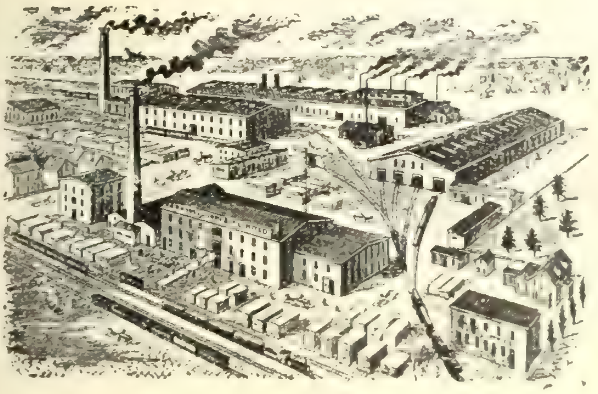

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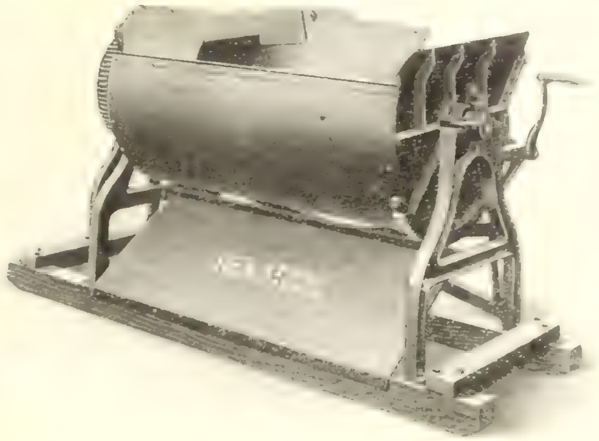

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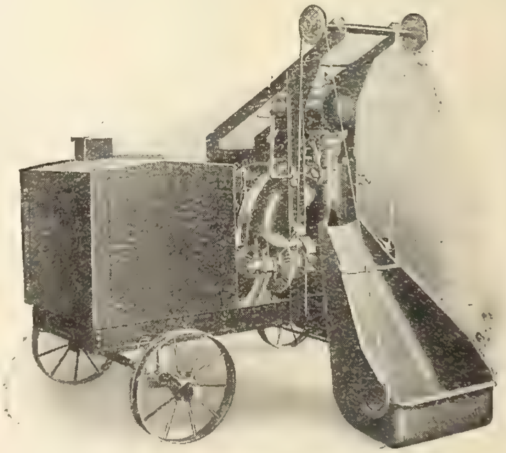

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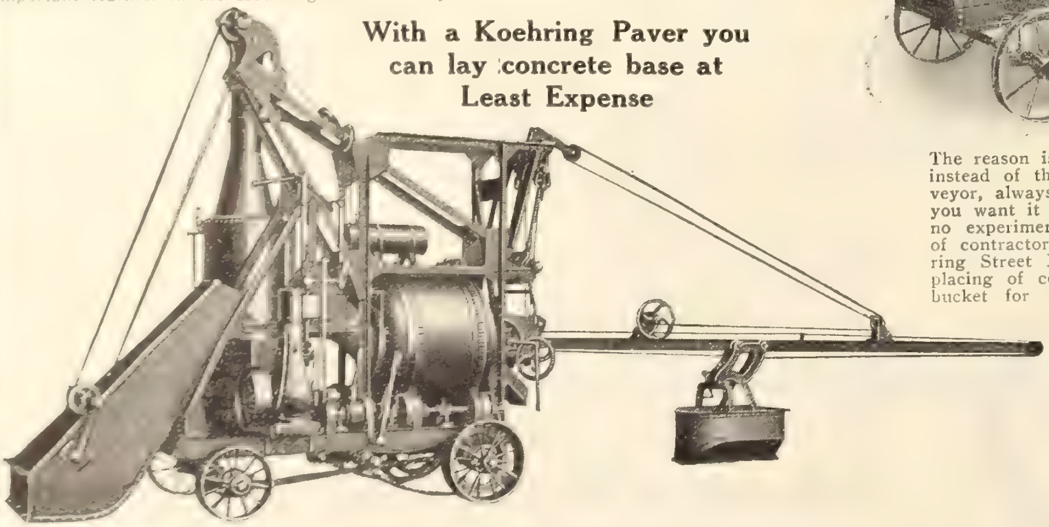

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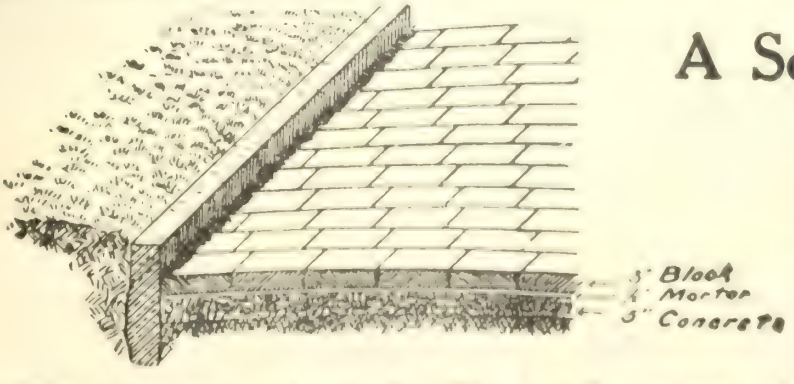

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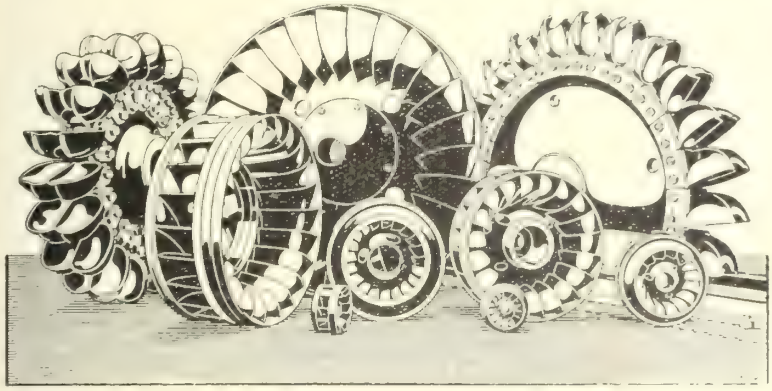

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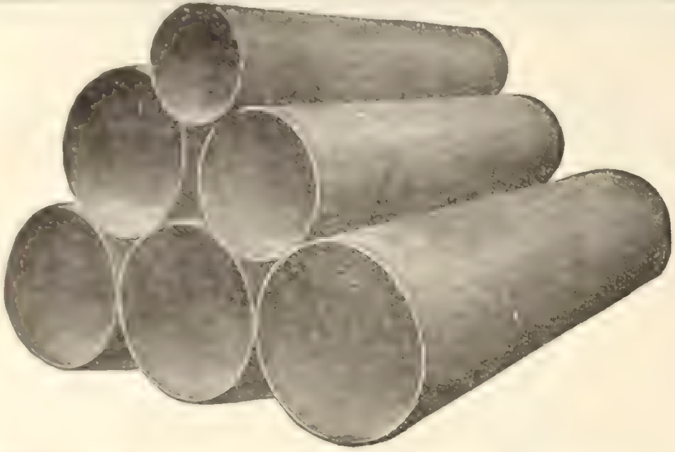

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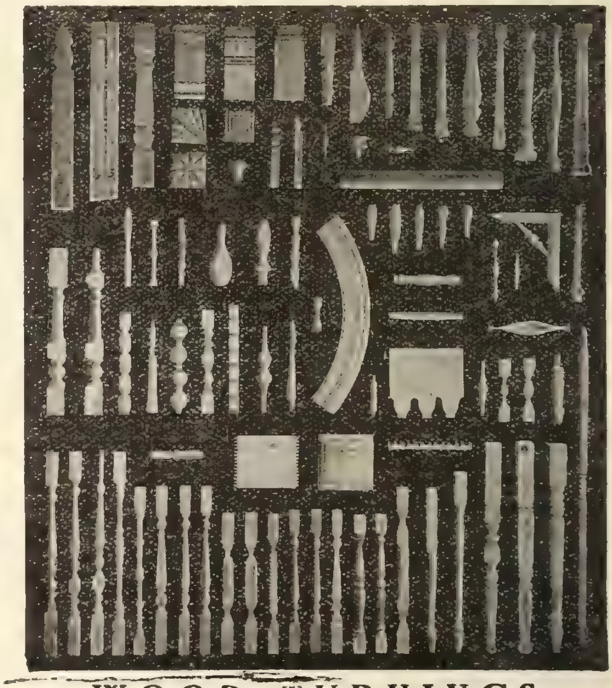

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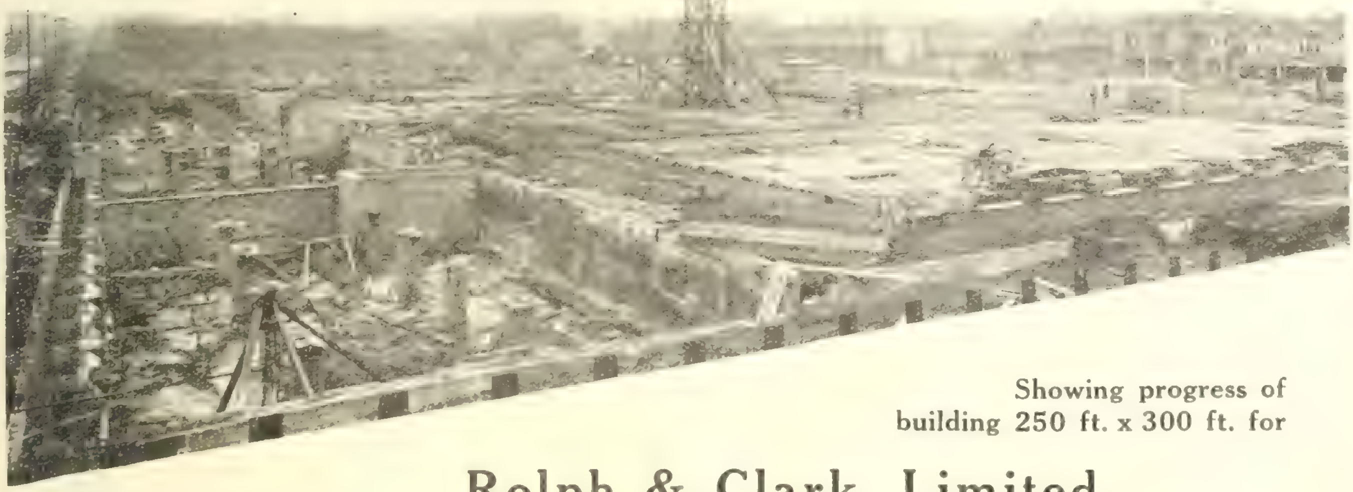

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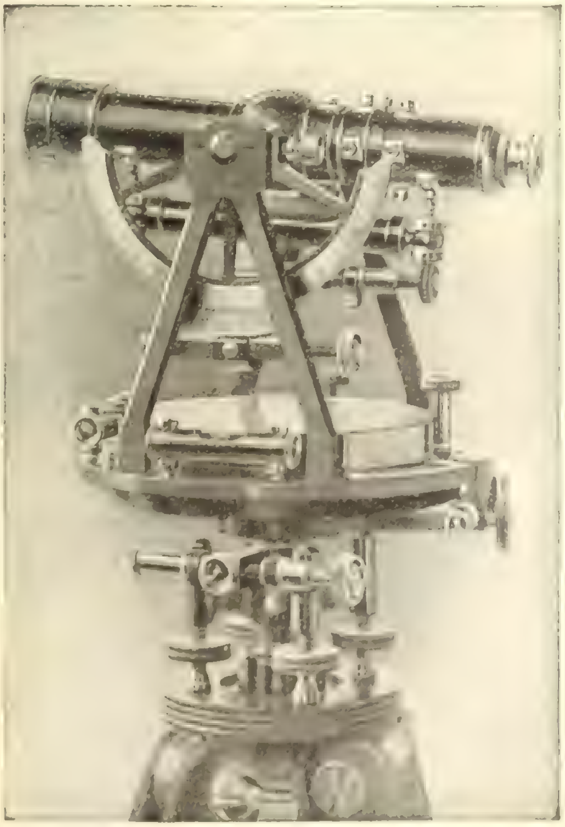

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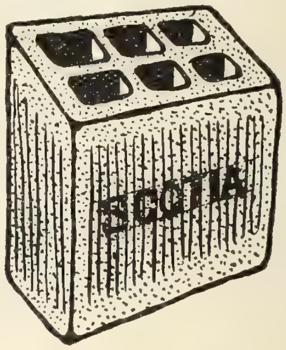

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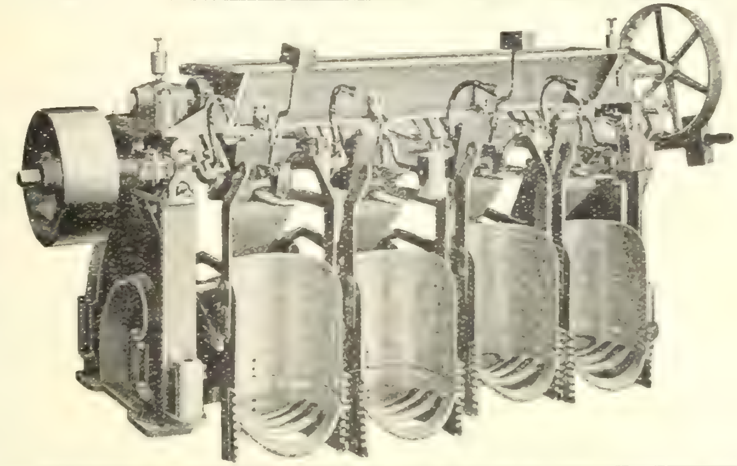

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14 in. x 16 in.	1/32 ft.	1/30 ft.		
15 in. x 15 in.	1/32 ft.	1/34 ft.		
15 in. x 16 in.	1/32 ft.		Total 8,393 ft. (B.M.)	

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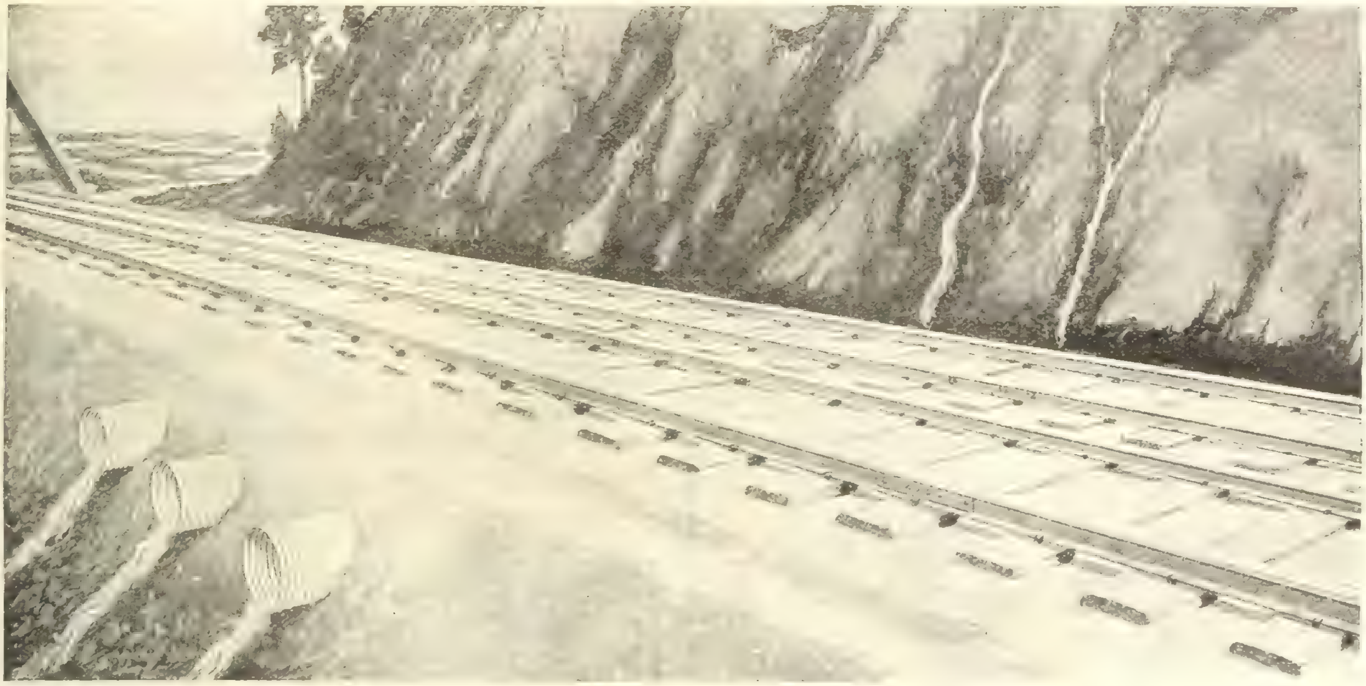

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TONCAN METAL

which resists pitting and corrosion. The corrosion in modern steel is to be avoided, especially for culverts and drainage troughs or piping. Practically the only known material for resisting corrosion under commercial conditions is Toncan metal, to be had only in Culvert made by the Pedlar People.

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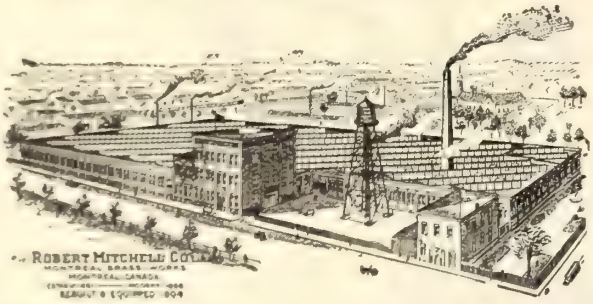

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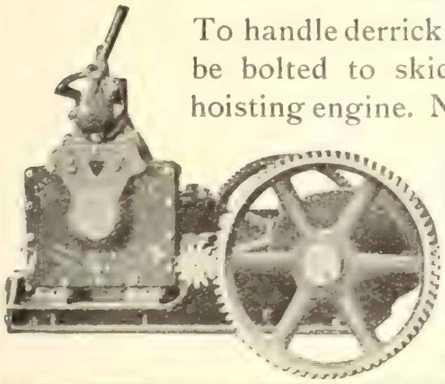

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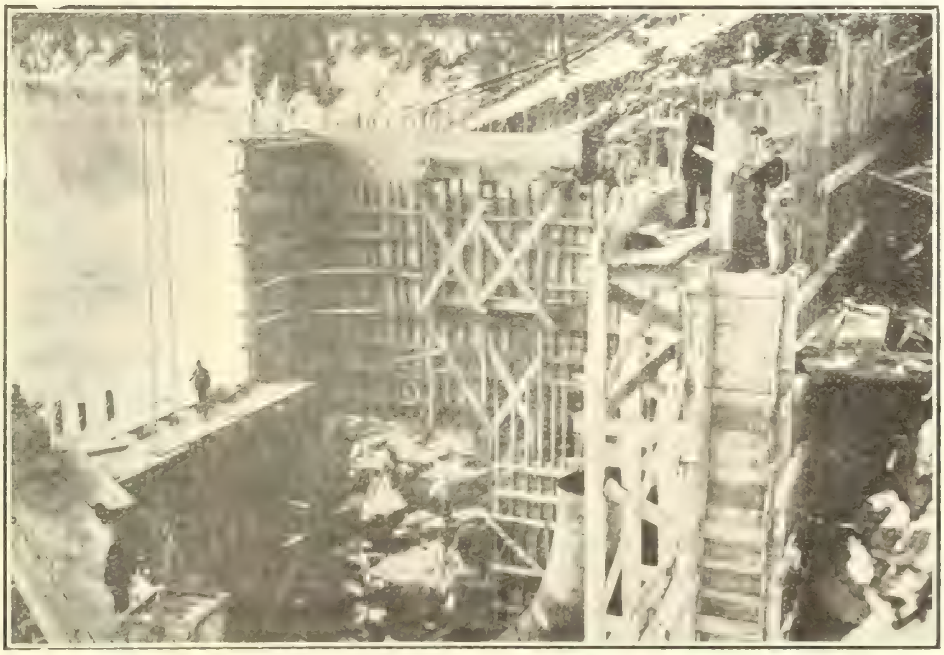

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	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No 1 enamelled bricks, all colors, from	$80 00 to $150 00

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Framing Lumber

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No. 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
7/8 x 8 and 10 in. pine shelving	36 00	40 00
7/8 x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

Shingles—

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

Cedar Posts—Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

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Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

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Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock	net $1.85
No. 4½ Fuller's	net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

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Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

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Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.40; 1-inch, $1.45; ⅜-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.40 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

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Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

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Pure White Lead, ground in oil, $8.50 per 100 lbs.

Boiled Linseed Oil, in bbls., 61c per gal. of 9 lbs.

Raw Linseed Oil, in bbls., 58c per gal. of 9 lbs.

Turpentine, in barrels, 64c. per gallon.

Pure Red Lead, dry $6.50 to $7.50 per 100 lbs.

Putty, pure linseed oil, in bulk, bbls., 3½c.

Putty, pure linseed oil, in 25-lb. tins, 4c.

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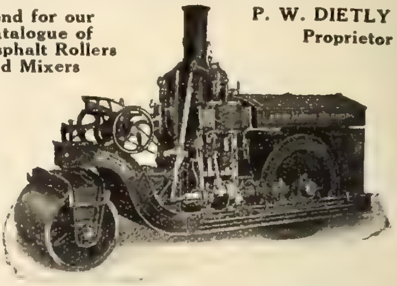

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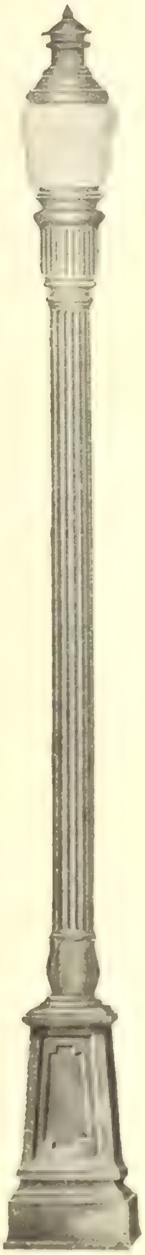

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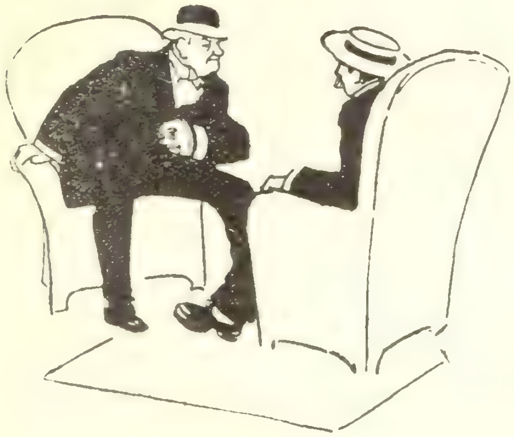

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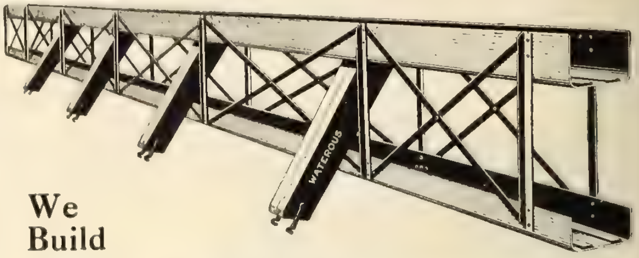

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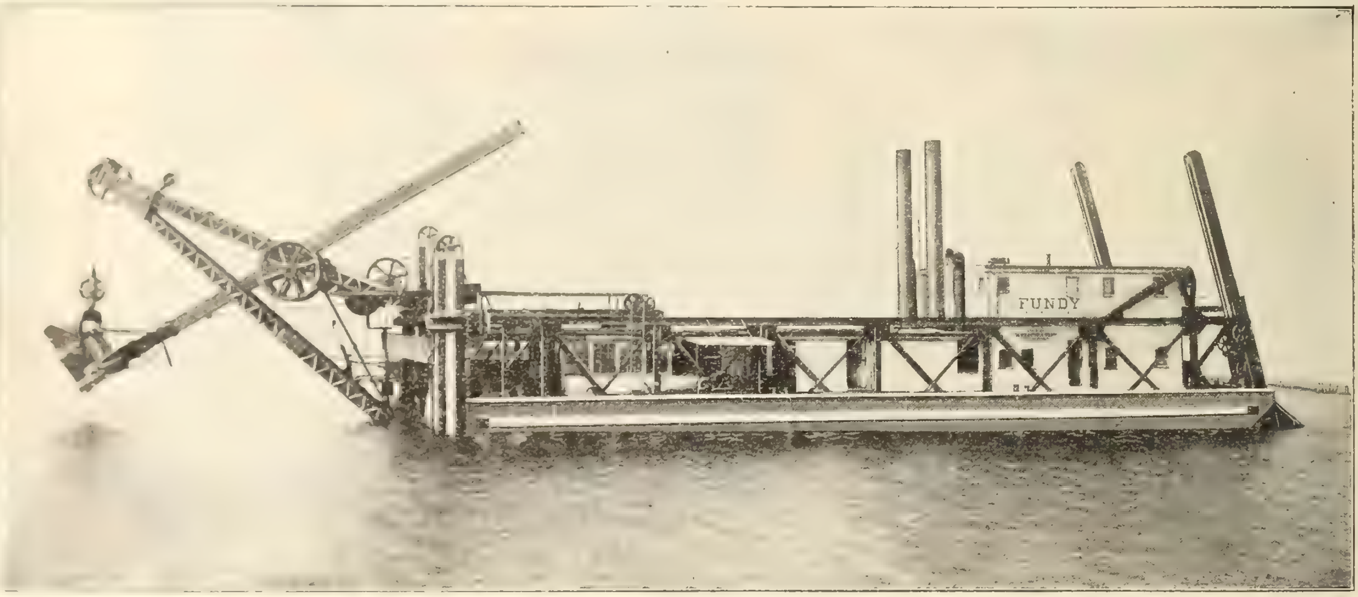

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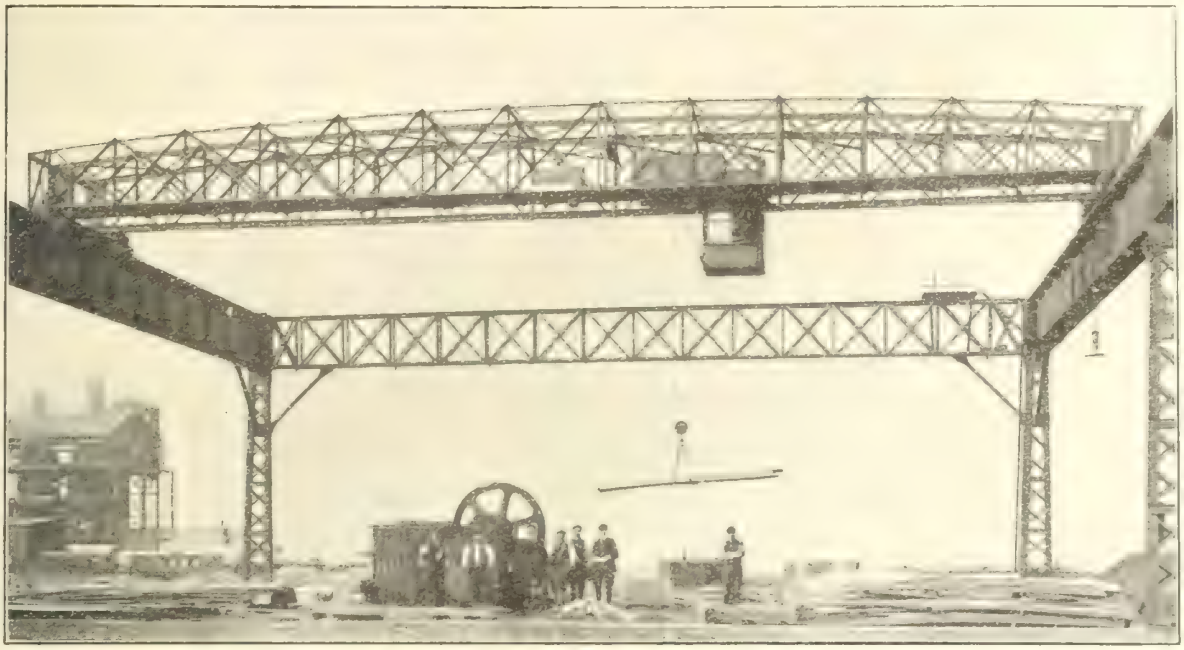

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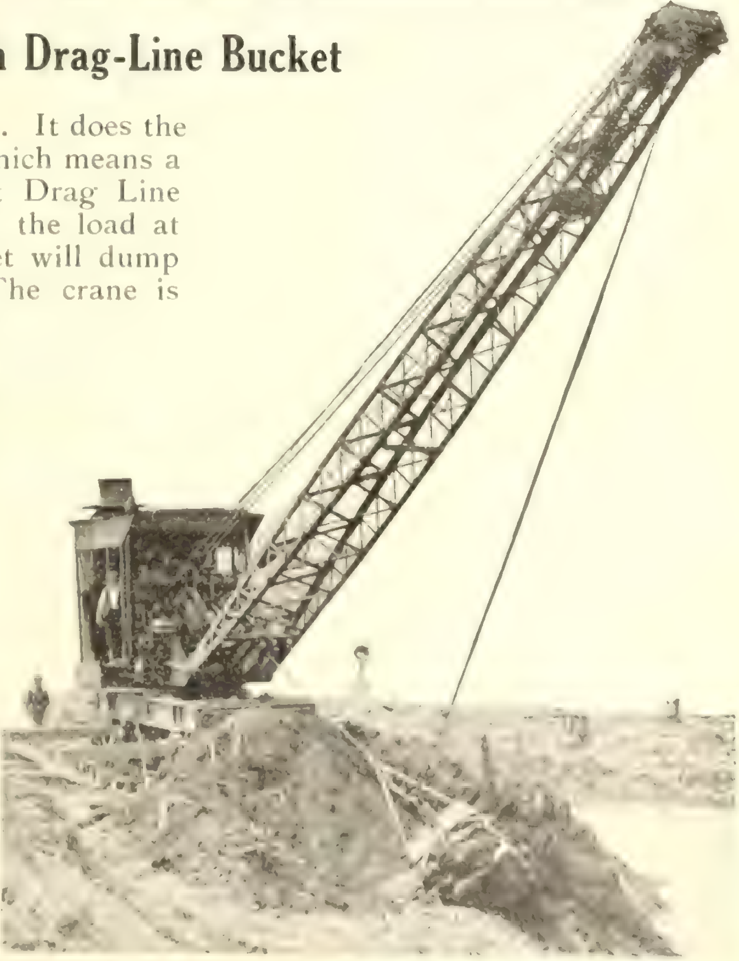

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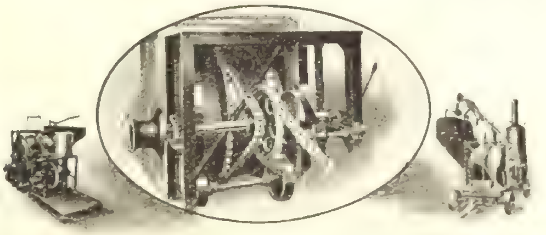

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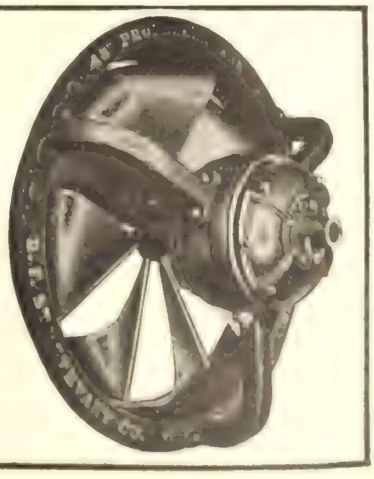

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Among our recent designs is the Bar Cutter No. 10 for cutting concrete reinforced bars—twisted, round or any other shape. It cuts bars up to 1½" thick and, due to its steel frame, its **weight is only half** that of a cast iron machine of the same capacity. Ask for catalog of Steel Punches, Shears and Drills No. 145.

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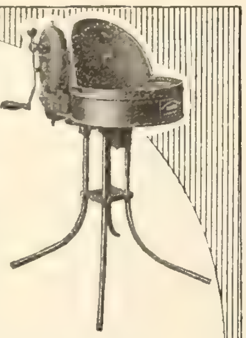
"Built to Last"



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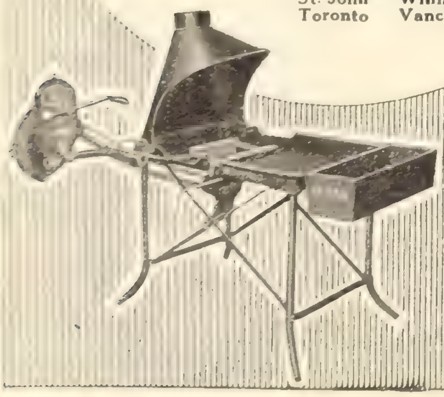

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"THE INTEGRAL METHOD" of water-proofing consists in incorporating the compound with the cement.

Used throughout the concrete or applied in the form of a plaster coating.

HYDRATITE is used in either connection.

Made in paste or powder to suit individual preference.

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can have the best Concrete that can be made at the least possible cost

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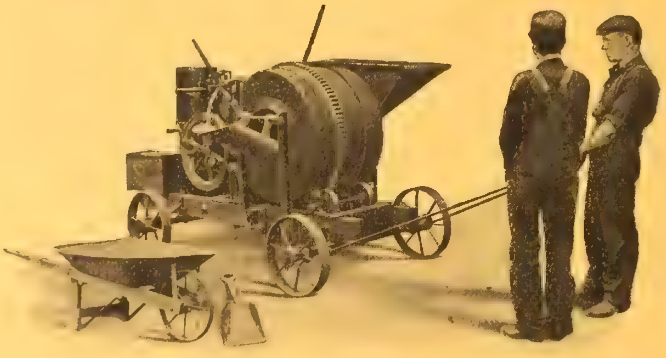

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Vol. 27 Toronto, March 12, 1913 No. 11

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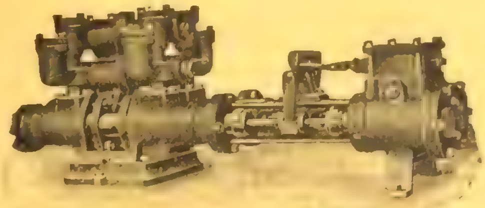

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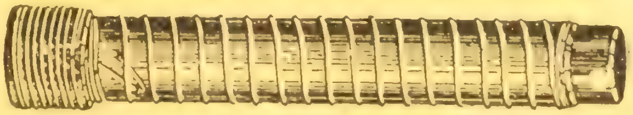

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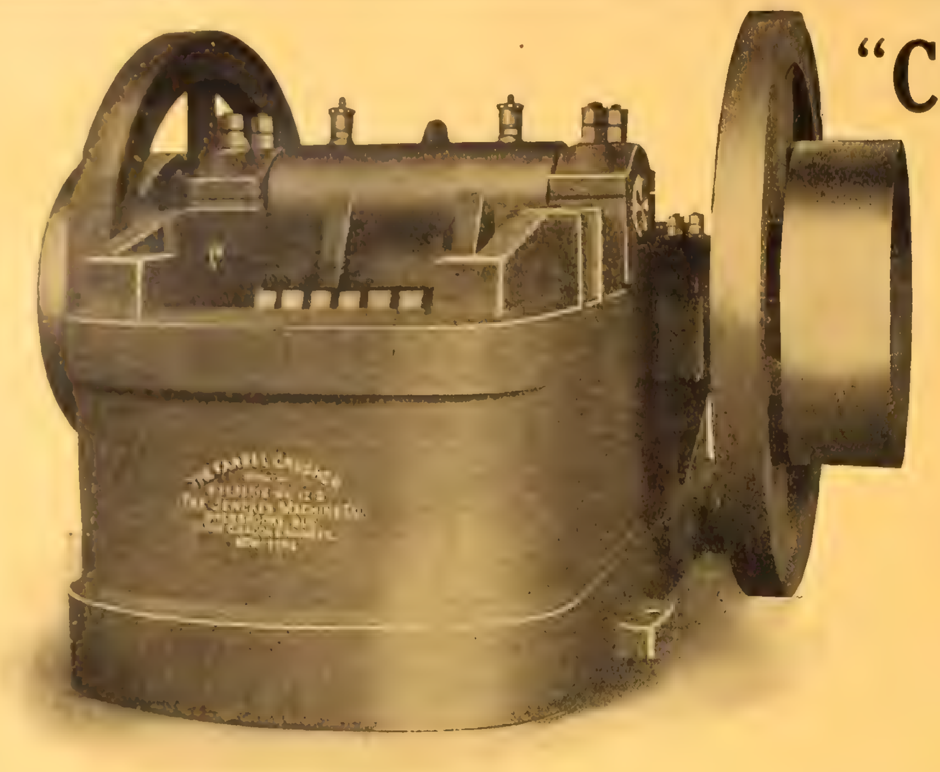

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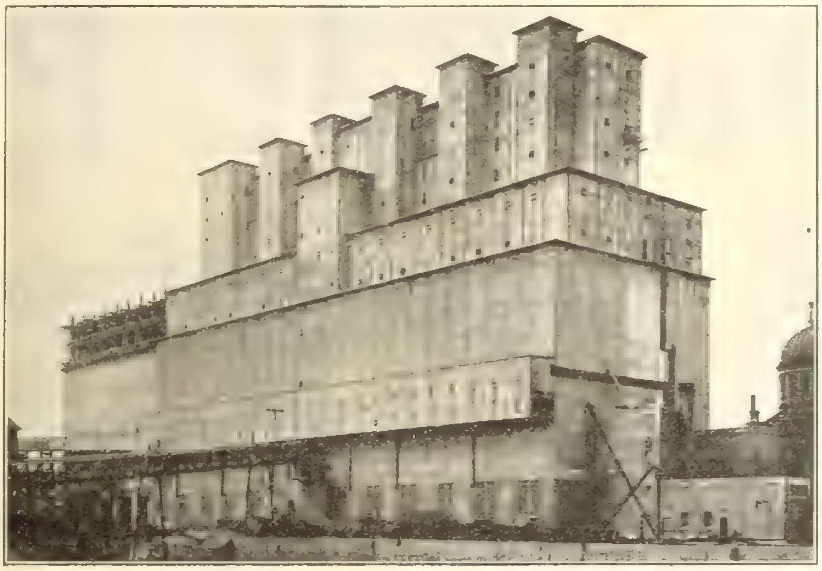

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- Hopkins & Co., F. H.
- International Marine Signal Co.
- Lecky & Collis
- Marsh & Henthorn
- Montreal Locomotive Works
- Mussens Limited
- Royce Limited
- Stinson-Reeb Builders' Supply Co
- Tiffin Wagon Co.
- Turner & Sons, J. J.
- Urschel Bates & Co.
- Vulcan Iron Works
- Woodstock Wind-Motor Co.

Core Drills
- Can. Ingersoll-Rand Co., Ltd.

Cork Installation Mrchinery
- Linde British Refrigeration Co.

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- Can. H. W. Johns-Manville Co
- Metallic Roofing Co.
- Ormsby, A. B., Limited

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- American Hoist & Derrick Co.
- Browning Engineering Co.
- Brown Hoisting Machinery Co.
- International Marine Signal Co.
- Royce Limited

Creosote Stains
- Cabot, Inc., Samuel

Crushed Stone and Granite
- Sand and Supplies
- Smyth & Ryan

Crushers (Stone and Rock)
- Hamilton Mfg. Co., Wm.
- Hopkins & Co., F. H.
- Jenckes Machine Co.
- Lecky & Collis
- London Concrete Machinery Co.
- Mussens Limited
- Morrison & Co., T. A.

Derricks and Derrick Fittings
- American Hoist & Derrick Co.
- Hepburn, John T.

Dredges
- Beatty & Sons, M.
- Browning Engineering Co.

Drills
- Beatty & Sons, M.
- Canadian Buffalo Forge Co.
- Canada Foundry Co.
- Canadian Ingersoll-Rand Co.
- Lecky & Collis

Drilling Contractors
- Harvey, J.

Drill Steel Sharpeners
- Canadian Ingersoll-Rand Co.

Dump Cars, Wheels, etc.
- Bechtels Limited
- General Supply Co.

Electric Air Rock Drills
- Canadian Ingersoll-Rand Co.

Electrical Machinery and Supplies
- Engineering Works of Canada

Engines
- Canadian Boving Co.
- Canadian Buffalo Forge Co.
- Inglis, John
- Jenckes Machine Co.
- Laurie & Lamb
- Leonard & Sons, E.
- McDougall Caledonian Iron Wks.
- Mussens Limited
- Sturtevant Co. of Can. Ltd., B. F.
- Waterous Engine Works Co.

Engineers (Civil) and Mechanical
- Barber & Young
- Bowman & Connor
- Campbell, R.
- Chipman & Power
- Farmer, John T.
- Galt Engineering Co., John
- Hancock, H. Syd.
- Inglis, John
- Kennedy, Jas. C.
- Kortring & Green
- Lea & Ferguson.
- Mitchell, C. H.
- Wood and Service

Expansion Bolts
- Star Expansion Bolt Co.

Expanded Metal
- Mannesmann Tube Co.

Exhaust Heads
- Canadian Buffalo Forge Co.
- Sheldons Limited
- Sturtevant Co. of Can. Ltd., B. F.

Field Instruments
- Ainsworth, Wm. & Sons
- Buff & Buff Mfg. Co.
- Gurley, W. & L. E.

Filler, Floor and Sewer Joint Asphalt
- Canadian Mineral Rubber Co.

Filters
- American Water Softener Co.

Fire Brick
- Improved Equipment Co.
- Smyth & Ryan

Fireproof Doors and Windows
- Metal Shingle & Siding Co.
- Mussens Limited
- Ormsby, A. B.
- Steel & Radiation Ltd.

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- Lecky & Collis

Forges
- Canadian Buffalo Forge Co.

Furnaces (Special)
- Improved Equipment Co.

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- Mitchell Co., Robert.

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- Improved Equipment Co.

Gas Producers for Heating
- Improved Equipment Co.

Gas Machinery
- Improved Equipment Co.

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- Consolidated Glass Co.
- Hamilton Art Glass Co.
- Hobbs Mfg. Co.
- Luxfer Prism Co.
- Toronto Plate Glass Imp't'g Co

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- Canadian Ingersoll-Rand Co.

Heating Apparatus
- Canadian Buffalo Forge Co.
- Sheldons Limited
- Jenckes Machine Co.

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- Canadian Boving Co.
- Escher Wyss & Co.

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- American Hoist & Derrick Co.
- Beatty & Sons, M.
- Browning Engineering Co.
- Canadian Fairbanks-Morse Co.
- Canadian Ingersoll-Rand Co.
- Doty Marine Engine & Boiler Co
- Inglis, John
- Jenckes Machine Co.
- Hopkins & Co., F. H.
- Lecky & Collis
- Marsh & Henthorn
- Mussens Limited
- Royce Limited
- Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
- Canadian Fairbanks-Morse Co.

Horse Stable Fittings
- Beatty Bros.

Hydrants
- Canada Iron Corporation
- Gartshore-Thomson Pipe Co.
- Kerr Engine Co.

(Continued on page 12)

Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.

Lumsden Building, Toronto

J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.

Don Valley Fireproofing, Bricks and Tile used throughout.

Traders Bank, Toronto

Carrere & Hastings and F. S. Baker, Associate Architects.

Don Valley Porous Terra Cotta Fireproofing and 2,0000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

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Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Bell Telephone Building

Adelaide Street, Toronto

W. J. Carmichael, Architect. Wickett Limited, Contractors.

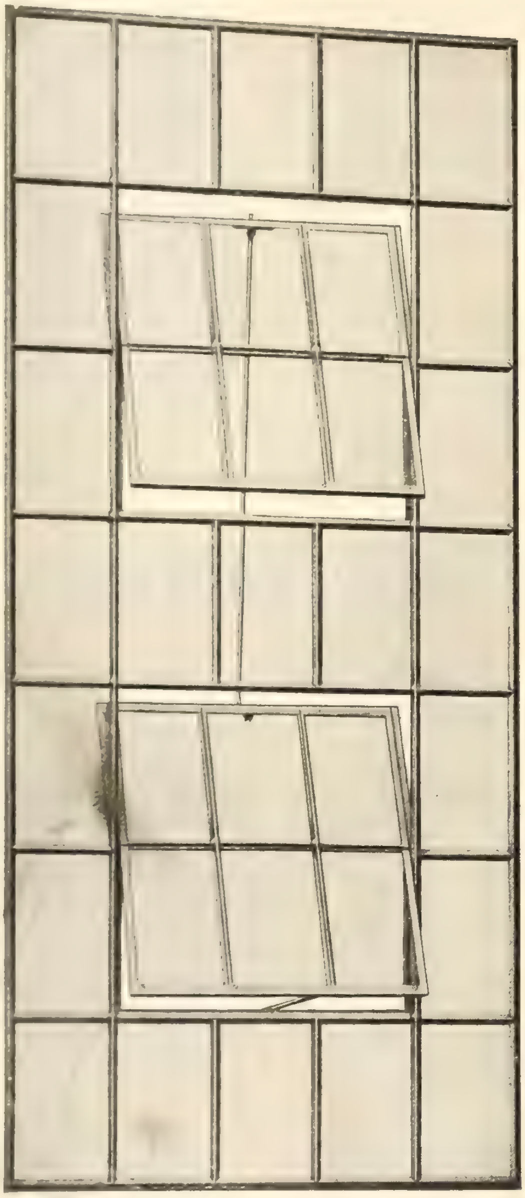
Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

TORONTO - ONTARIO

LET IN THE LIGHT



"Fenestra"

Fenestra
TRADE MARK

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,

Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

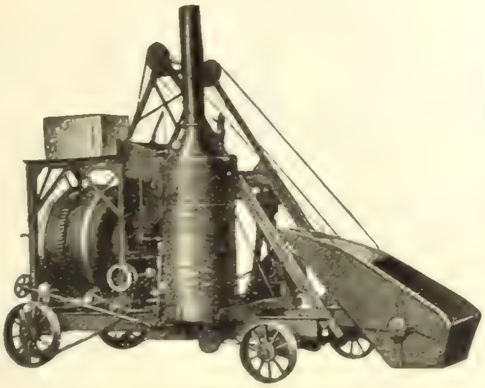
proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons,
Railroad Shops, Warehouses, Barracks, etc.

We will help you to settle the problem of your window requirements—write us.

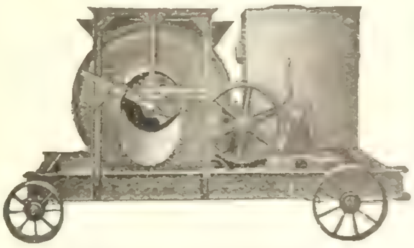
STEEL and RADIATION, Limited

TORONTO, CANADA



London Paving Machine with Front Loader

London Concrete Machinery is built up to a standard.



London Standard Batch Mixer with Charging Bin, Gasoline Power

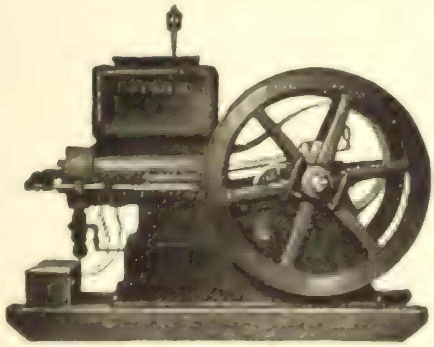
CONTRACTORS—It is worth something to you to know that when you use the LONDON MACHINES you have an equipment which is not a back number.

ALL OUR MACHINES are built by up-to-date METHODS and by the MANY NEW and IMPROVED FEATURES of the LONDON MACHINES place them in A CLASS by themselves.

London Face Down Concrete Block Machine

We are saving the Contractor money in the COST OF MACHINE, COST OF OPERATING, COST OF MAINTENANCE, everything made in our own shops. We sell direct to the contractor.

We are the only large Canadian Firm who specialize on Concrete Machinery.



Standard Gas Engine, made in all sizes

Send for
1912
Catalogue

stating LINE interested in. We manufacture a full line of Concrete Machinery and Cement Working Tools.

London Automatic Batch Mixer No. 2

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, (106 Pleasant St.) G. B. Oland, Mgr.

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VANCOUVER, B. C. Equipment Co.,
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng. & Supply Co
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

EVENTUALLY

—WHY NOT NOW?

You **must** have a **Good Mixer** some time—You can't go on putting up with a poor makeshift—You will realize some time that you **must** have a mixer that will do the best work, and when you realize that you will naturally turn to

The Famous
WETTLAUFER HEARTSHAPE MIXER

This is the mixer that will do **good work** for you **all the time** — the mixer that saves you time and money and increases the efficiency of your equipment.

Strong Construction

Automatic Operation

Low Working Cost

Rapid and Perfect Mixing

Increased Capacity

Minimum Repairs

Full particulars and catalogue on request.
Come and see this mixer working—Continuous demonstrations at

WETTLAUFER BROTHERS

TORONTO, ONTARIO

FACTORIES : **Mitchell, Ont.** **Buffalo, N. Y.** **Detroit, Mich.**

AGENCIES :

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15 Dock St., St. John, N. B.

Lavallee Ross, Limited
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Edmonton, Alta.

Hooton & Moore
613 Ashdown Block,
Winnipeg, Man.

MONTREAL OFFICE and WAREROOMS : **316 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave.**

For Your Next Shipment of Cement, Order

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

ROGERS
Portland Cement

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at
Kirkfield - Owen Sound - Hanover - Orangeville - St. Mary's

Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone—but cheaper.—A perfect imitation—Adaptable to all ornamentation or architectural decoration, both interior and exterior.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

28 King St. West
Toronto, Ontario

Western Sales Manager
W. J. DINNEN & CO., Winnipeg, Man.

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Ice-making Machinery
Linde British Refrigeration Co

Insulating Compounds
Canadian Mineral Rubber Co
Standard Underground Cable Co. of Canada, Limited

Interior Finish and Doors
Batts Limited
Canada Office & School Fur. Co
Oshawa Int. Fittings Co.
Rhodes Curry & Co.

Kilns
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F

Lime
Jamieson Lime Co.
Ontario Lime Association

Lime Kilns
Improved Equipment Co.

Locomotives
Canadian Boving Co.
Montreal Locomotive Works
Canada Foundry Co.

Marble
Dominion Marble Co.
Lautz Company
Missisquoi Marble Co.

Metal Lath
Greening Wire Co., B.
Metallic Roofing Co.
Noble, C. W.
Steel & Radiation Ltd.

Metal Forms
Hotchkiss Lock Metal Form Co.

Meters, Electrical
Ferranti Electrical Mfg. Co.

Meters, Water
Hopkins & Co., F. H.
McDougall Caledonian Iron Wks
Neptune Meter Co.

Motor Trucks
Jones & Glassco

Packing and Pipe Coverings
Garlock Packing Co.

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Canadian Mineral Rubber Co.

Paints and Varnishes
Elaterite Paint Co.
Goheen Co.
Pinchin, Johnson & Co.

Paving Cement
Canadian Mineral Rubber Co.

Paving and Paving Materials
Dominion Creosoting Company
Metropolitan Paving Brick Co.
Ontario Asphalt Block Co.
Paterson Mfg. Co.

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Canada Wire & Iron Goods Co.
Greening Wire Co., B.

Pipe (Concrete, Iron and Wood)
American Spiral Pipe Works
Canadian Pipe Co.
Dominion Concrete Co.
Gartshore-Thomson Pipe Co.
Munderloh & Co.
National Iron Works
National Pipe & Foundry Co.
Pacific Coast Pipe Co.
Pedlar People Limited.
Piggott & Co., Thos.

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Browning Engineering Co.
Canadian Ingersoll-Rand Co.
Lecky & Collis
Vulcan Iron Works

Planing Mill Exhausters
Canadian Buffalo Forge Co.
Sheldons Limited

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Alabastine Co.
Albert Mfg. Co.
Britnell & Co.
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Plug Drillers
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Plumbers' Supplies
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Plumbers and Steam Fitters Brass Goods
Mitchell Company, Robt.

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Canadian Ingersoll-Rand Co.

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Canadian Fairbanks-Morse Co.

Portable Track
Bechtels Limited

Power Engines
Inglis Company, John

Pumps and Pumping Machinery
Bates & Edmonds
Beatty & Sons, M.
Canada Foundry Co.
Canadian Boving Co.
Canadian Buffalo Forge Co.
Canadian Fairbanks-Morse Co.
Canadian Ingersoll-Rand Co.
Cook, A. D.
Escher Wyss & Co.
General Supply Co.
Hamilton Mfg. Co., Wm.
Hopkins & Co., F. H.
Inglis & Co., John
McDougall Caledonian Iron Wks.
Smart-Turner Machine Co.
Waterous Engine Works Co.
Mussens Limited
Ontario Wind Eng. & Pump Co.

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Canadian Ingersoll-Rand Co.
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Lecky & Collis
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Gartshore, John J.
Hopkins & Co., F. H.
Mussens Limited

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Linde British Refrigeration Co.

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Ambursen Hydraulic Cons. Co.
Canada Steel Co., Ltd.
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Greening Wire Co., B.
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Steel & Radiation Ltd.
Trussed Concrete Steel Co.
Turner, C. A. P.

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Canadian Mineral Rubber Co.

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Erie Machine Shops
Lecky & Collis
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Western Wheeled Scraper Co.

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Asbestos Mfg. Co.
Can. H. W. Johns-Manville Co.
Canadian Mineral Rubber Co.
Canadian Supply Company
Metallic Roofing Co.
Noble, Clarence W.
Paterson Mfg. Co.

(Continued on page 14)

ACCURATE METERS

Ferranti

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Glass Case—Top Connections

Steel Case—Top or Bottom Connections

The Ferranti Electrical Co. of Canada, Limited
TORONTO, 90 Sherbourne St. WINNIPEG, 56 Albert St.

BAY STATE

This is the man that made

BAY STATE
Brick and Cement Coating

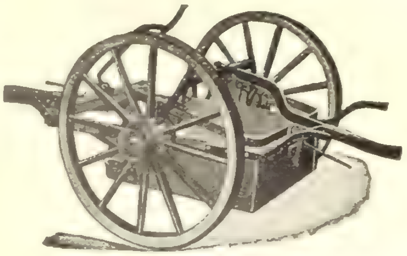
famous, and it in turn has made the name **WADSWORTH, HOWLAND & CO., Inc.** known wherever a coating for concrete, stucco, or brick is used.

He's the trade mark not only of the best concrete, stucco or brick coating in the market but of the WHOLE BAY STATE line of dependable paints, varnishes enamels and stains that stand weather and wear.

Ask your dealer for them. If he cannot supply you write us for booklet M. that tells about the BAY STATE line.

Wadsworth, Howland & Co., Inc.
Paint and Varnish Makers and Lead Corroders
82-84 Wellington Street, Boston, Mass.
New York Office, 156 Fifth Ave.

DON'T BE MISLED



THE ORIGINAL AND ONLY THOROUGHLY IMPROVED WHEELED SCRAPERS ARE

Western Wheeled Scrapers

None others are built as strong will give the same satisfactory service or contain the latest improvements.

The Westerns are noted for their capacity, light draft, simplicity and durability. They will shortly pay for themselves, and be paying you a handsome dividend on your investment.

Write for Catalogue.

Western Wheeled Scraper Co.
AURORA, ILLINOIS
Earth and Stone Handling Machinery
E. P. Jamison & Company, Ltd., Vancouver
Agents for British Columbia

Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS	1903	$ 0.00	1908	$ 93.26
	1904	3.30	1909	200.46
	1905	9.35	1910	14.07
	1906	37.33	1911	2.29
	1907	16.11		

Total $376.17 or 5⅔c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.
Hagersville, Ont. **Limited**

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Sand and Gravel
  Sand and Supplies Ltd.
  York Sand and Gravel Co

Screens
  Canada Wire & Iron Goods Co
  Greening [illegible] Mfg. Co., B

Sewer Joint Asphalt
  Canadian Mineral Rubber Co

Sewer Pipe
  Britnell & Co.
  Canada Iron Corporation
  Dominion Sewer Pipe Co.
  Gartshore Thomson Pipe Co.
  National Iron Works
  Ontario Sewer Pipe Co.
  [illegible]
  [illegible] Ltd

Sewer Trenching
  Lecky & Collis

Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
  Browning Engineering Co.
  Beatty & Sons, M.
  Canada Foundry Co., F. H.
  Hopkins & Co., F. H.
  Montreal Locomotive Works
  Mussens Limited
  Thew Automatic Shovel Co.
  Willis Shaw Mach. Co.

Shovels
  Lundy Shovel & Tool Co.

Smoke Stacks
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
  Cabot, Inc., Samuel
  Pinchin, Johnson & Co.

Steam Apparatus
  Canadian Buffalo Forge Co
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Steam Turbines
  McDougall Caledonian Iron Wks.

Steel
  Canada Steel Co., Ltd.
  Dominion Steel Castings Co.
  Lecky & Collis
  Provincial Steel Co.

Steel Bars
  Canada Steel Co., Ltd.
  Steel Co. of Canada.
  Steel & Radiation, Ltd.

Stone
  Britnell & Co.
  Brodie, Jas.
  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
  Roman Stone Co.
  Sackville Freestone Co.
  Sand & Supplies
  Smyth & Ryan

Stone Saws
  Anderson, Geo.

Structural Iron and Steel
  Canada Steel Co.
  DesMoines Bridge Co.
  Dominion Bridge Co.
  Dominion Steel Castings Co.
  Hamilton Bridge Works Co.
  Mackinnon Holmes & Co.
  McNeil & Co., W. P.
  Phoenix Bridge & Iron Works
  Provincial Steel Company
  Reid & Brown
  Sarnia Bridge Company
  Steel Co. of Canada
  Structural Steel Co.
  Standard Steel Construction Co

Submarine Drills
  Canadian Mineral Rubber Co.
  Lecky & Collis

Swinging Gears
  Dake Engine Company

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  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.
  Inglis, John
  Jenckes Machine Co.
  Marsh & Henthorn
  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Waterous Engine Works Co.

Testing and Inspecting Bureau
  Hunt & Co., Robt. W.

Valves
  Canada Iron Corporation
  Gartshore-Thomson Pipe Co.
  Kerr Engine Co.

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  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F.

Vacuum Cleaners
  Tuec Company

Varnishes—Insulating
  Standard Underground Cable Co. of Canada, Limited

Waterproofing
  Cabot Inc., Samuel
  Can. H. M. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Ceresit Waterproofing Co.
  Elaterite Paint Co.
  Pinchin, Johnson & Co.

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  American Water Softener

Water Turbines
  Canadian Boving Co.
  Escher Wyss & Co.
  Hamilton Mfg. Co., Wm.
  McDougall Caledonian Iron Wks.

Wire
  Canada Wire & Cable Co.
  Standard Underground Cable Co. of Canada, Limited

Wires and Cables
  Royce Limited

Wire Guards and Screens
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Wire Rope
  Canada Wire & Cable Co.
  Greening Wire Co., B.
  Smith, Thos. & Wm.
  Steel Co. of Canada

Wood Turnings
  Automatic Wood Box & Turning Company

These High-Grade Asphalts Insure High-Class Results

For 17 years "Pioneer" Asphalts have been specified by Engineers for important projects in which the highest efficiency and the greatest durability were of first consideration. The record of these materials is a record of success.

"Pioneer" Road Asphalt—For durable, waterproof, auto-proof macadam roads.

"Pioneer" Paving Cement—For reliable, economical Sheet Asphalt Pavements.

"Pioneer" Filler Asphalt—For filling the interstices in brick and block pavements. Sanitary—and always stays in place.

"Pioneer" Road Surface Asphalt—For building up macadam roads. Lays the dust—only one application a year necessary.

"Pioneer" Asphalt Mastic Floors—For manufacturing plants, breweries, canning establishments, ice plants, warehouses, etc.

"Pioneer" Asphalts have a Gilsonite base—99.5 per cent pure bitumen—and in actual service have established their supremacy. Specifications and further particulars on request.

In addition to the above we invite attention to "Pioneer" Mineral Rubber Pipe Coating, "Pioneer" Waterproofing Asphalt, "Pioneer" Sewer Joint Asphalt, "Sterling" Waterproofing Products, Structural Paints, Roof Paints, etc., etc.

THE CANADIAN MINERAL RUBBER CO., Ltd.
Montreal Winnipeg Victoria London, Eng.

Tarvia

Preserves Roads
Prevents Dust

Rosland Street, Berlin, Ont., Constructed with Tarvia Modern Pavement

Berlin's Experience with Tarvia

The above street in Berlin, Ont., was built in 1912 with a five or six inch base course of broken field stone laid on a well rolled subgrade. The stone was filled with sand and rolled and then three-quarters of a gallon of Tarvia X per square yard was applied. A second or wearing course of stone about 2½ inches in depth was spread on the Tarvia and about 1¼ gallons of Tarvia X was spread over each yard of this stone. Screenings were then added to fill the voids and thoroughly rolled in. A seal coat of approximately ½ gallon per yard was then applied, covered with coarse sharp sand and rolled.

This is the method which the city of Berlin has used in all their construction work for the past three years. The oldest roads of this type are giving excellent satisfaction and in fact, their success is the reason for their steady extension.

A road so constructed is bonded for seven inches of its depth with the densest and most viscid of bitumens. The road will not change its contour for many years and if the surface screenings are occasionally renewed, the maintenance cost of the road will be less than for any other type. The surface is smooth, waterproof, quiet, cleanly and handsome. In fact, the layman finds it difficult to believe that these are macadam roads at all.

The foregoing is the most thorough type of Tarvia work. For surface treatment and dust prevention, there are the lighter grades of Tarvia—Tarvia A and Tarvia B, the cost of which is less and the work of application simpler. Booklets on request.

THE PATERSON MANUFACTURING COMPANY, LIMITED
MONTREAL TORONTO WINNIPEG VANCOUVER

THE CARRITTE-PATERSON MANUFACTURING CO., LIMITED
ST. JOHN, N.B. HALIFAX, N.S.

ALPHABETICAL LIST OF ADVERTISERS

[illegible]	80
[illegible]	84
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[illegible] Portland Cement Worws	85
[illegible]	79
[illegible] & Tile Co.	88
[illegible] & [illegible] Co.	2
[illegible]	25
American Water Softener Company	84
Anderson & Co., Limited, George	22
[illegible]	80
[illegible] Company	83
[illegible] Company	85
[illegible] Co.	88
[illegible] R. D.	
[illegible] Company	41
[illegible]	107
Beath & Son, Limited, W. D.	30
Beatty & Sons, Limited, M.	
[illegible]	
[illegible]	92
Bennett, Robert	106
Black Building Supply Company	37
Blystone Machinery Company	83
Bowman & Connor	104
Britnell & Company, Limited	94
Browning Engineering Company	25
[illegible]	99
Brown Hoisting Machinery Company	
[illegible] Company	94
Brodie & Company, James	
Cabot, Incorporated, Samuel	95
Campbell, R.	104
Canada Cement Company	3
Canada Foundry Company, Limited	34
Canada Iron Corporation Limited	99
Canada Lifting Jack Company	
Canada Steel Company	25
Canada Wire & Cable Company	33
Canada Wire & Iron Goods Company	80
Canadian Boving Company	26
Canadian Bridge Company	96
Canadian Buffalo Forge Company	110
Canadian Fairbanks-Morse Co., Ltd.	111
Canadian H. W. Johns-Manville Co.	
Canadian Kellogg Company	41
Canadian Mineral Rubber Company	14
Canadian Office School Furniture Co.	
Canadian Pipe Company, Limited	34
Canadian Ingersoll-Rand Company	38
Canadian Supply Company	
Ceresit Waterproofing Company	
Chain Belt Company	81
Chipman & Power	104
Clapham & Sons, John	80
[illegible]	
Conduits Company Limited	99
Consolidated Stone Company	84
Consolidated Plate Glass Company	
Consumers Gas Company	100
Contractors' Supply Company, Ltd.	94
Cook, A. D.	84
Corinthian Stone Company	91
Crown Gypsum Company	22
Crushed Stone Limited	87
Dake Engine Company	99
Dennis Wire & Iron Works Company	81
DesMoines Bridge & Iron Company	97
Dikeman Surveyor Company	104
Dickson Bridge Works	19
Dominion Bridge Company	96
Dominion Concrete Company	78
Dominion Creosoting Company	82
Dominion Ornamental Iron Company	105
Dominion Marble Company	19
Dominion Sewer Pipe Company	18
Dominion Steel Castings Company	24
Dominion Wood Pipe Company	88
[illegible] Valley [illegible] Works	7
Doty Marine Engine & Boiler Co.	23
Douglas-Milligan Company	
Flaterite Paint Company	
Engineering Works of Canada	
Erie Machine Shops	95
Escher Wyss	
Farmer, John T.	104
Ferguson, H. S.	104
Ferranti Electrical Company	12
Foundation Company	
Fuce & Smith	104
Galt Engineering Company, John	104
Galt Stove & Furniture Company	78
Gardner & Saxby	104
Gartshore, John J.	104
Gartshore-Thompson Pipe & Foundry Co.	98
Gaudry & Company, L. H.	103
Gibbs & Canning	
Goheen Manufacturing Company	
Goodyear Tire & Rubber Co. of Canada, Ltd.	39
Greening Wire Company, Limited, B.	35
Gurley, W. & L.	89
Hagersville Contracting Company	13
Hancock, Jr., H. Syd.	104
Hamilton Art Glass Co., Ltd.	80
Hamilton Bridge Company	26
Hamilton Mfg. Company, Wm.	19
Hamilton Pressed Brick Company	
Harvey, J.	102
Heinicke Company, H. R.	18
Hepburn, John T.	31
Hobbs Manufacturing Company	
Hopkins & Company, F. H.	112
Hotchkiss Lock Metal Form Company	87
Hunt & Company, Robert W.	104
Improved Equipment Company	90
Imperial Wire & Cable Company	111
Inglis Company, John	35
International Marine Signal Co.	81-88
Jamieson Lime Company	
Jenckes Machine Company	2
Jennings & Ross	
Jones & Glassco	40
Kennedy, James C.	104
Kerr Engine Company, Limited	93
Koehring Machine Company	103
Laurentian Granite Company	104
Laurie & Lamb	1
Lautz Company	109
Lea, R. S.	104
Lecky & Collis	17
Leonard & Sons, E.	87
Linde British Refrigeration Company	108
London Concrete Machinery Company	9
Lundy Shovel & Tool Company	36
Luxfer Prism Company	86
MacLean Daily Reports	101
Mahan & Company	
Mannesmann Tube Company	92
Marsh & Henthorn, Limited	78
McDowall, R.	104
McKinnon Holmes & Company	
McMillan & Sons, W.	
McNeil & Company, William P.	98
Meadows, George B.	41
Metal Shingle & Siding Company	81
Metallic Roofing Company	83
Miller & Company, Geo. M.	102
Missisquoi Marble Co., Ltd.	88
Mitchell Company, Limited, Robert	96
Montreal Locomotive Works Limited	87
Montreal Real Estate Show	
Morrison & Company	102
Mussens Limited	4
Myers, Oakley	87
Napance Iron Works	17
National Bridge Company of Canada	97
National Iron Works Limited	99
National Pipe & Foundry Company	98
Neptune Meter Company	97
Nelsonville Brick Company	
Noble, Clarence W.	21
Northwestern Terra Cotta Company	90
Nova Scotia Clay Works	90
Ontario Asphalt Block Co., Ltd.	85
Ontario Lime Company, Limited	89
Ontario Sewer Pipe Company	18
Ontario Wind Engine & Pump Co.	87
Ormsby Limited, A. B.	20
Oshkosh Manufacturing Company	33
Owen Sound Iron Works	26
Pacific Coast Pipe Company	1
Paterson Manufacturing Company	15
Pedlar People	
Phoenix Bridge Company	90
Piggott & Company, Thomas	105
Pinchin Johnson & Company	110
Power & Son	102
Provincial Steel Company	24
Queenstown Quarry Company	99
Reid & Brown	104
Rhodes Curry Company, Limited	83
Richardson, J. E.	
Rogers, Limited, Alfred	11
Rogers Supply Company	41
Roman Stone Company	28
Royce Limited	
Sackville Freestone Company, Limited	21
Sand & Supplies Limited	98
Sarnia Bridge Company, Limited	97
Sheldons Limited	20
Sheppard, James	
Silcox, A. B.	95
Slack & Company, T.	102
Smart-Turner Machine Company	1
Smith Limited, Thos. & Wm.	
Smyth & Ryan	90
Standard Clay Products Limited	32
Standard Ideal Company	42
Standard Steel Construction Co.	97
Standard Underground Cable Co. of Canada	
Stanley Company, W. F.	33
Star Expansion Bolt Company	19
Steel Company of Canada	24
Steel & Radiation	8
Stinson-Reeb Builders' Supply Co.	42
Structural Steel Company	96
Sturtevant Co. of Canada, Ltd., B. F.	25
Taylor, J. & J.	80
Thew-Automatic Shovel Company	23
Tiffin Wagon Company	29
Toledo Wheelbarrow Company	105
Toronto Plate Galss Importing Co.	1-90
Toronto Iron Work	85
Troy Wagon Company	
Trussed Concrete Steel Company	94
Tuec Company	79
Turner, C. A. P.	86
United States Steel Products Co.	27
United Typewriter	
Urschel-Bates Valve Bag Company	
Wadsworth Howland Co.	13
Waterous Engine Works Company	95
Weeks, Arthur L.	104
Welch & Company, H. J.	104
Wells & Gray	
Western Canada Contractor	94
Western Wheeled Scraper Company	13
Wettlaufer Bros.	10
Woodstock Wind Motor Company	32
Wood and Service	104
Wooliscroft & Son, G.	
York Sand & Gravel Company	94

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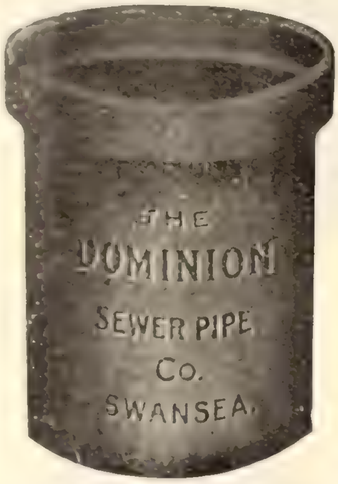

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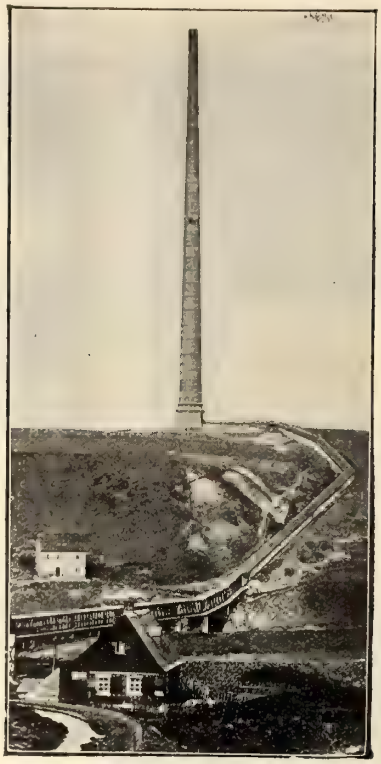

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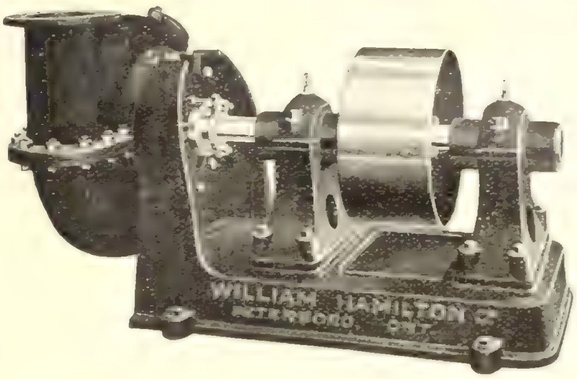

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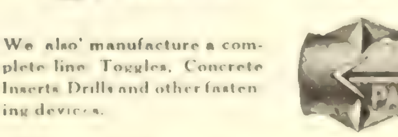

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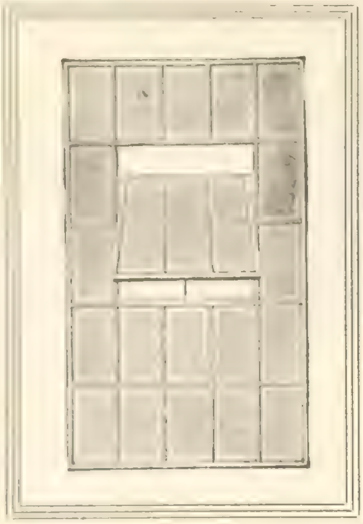

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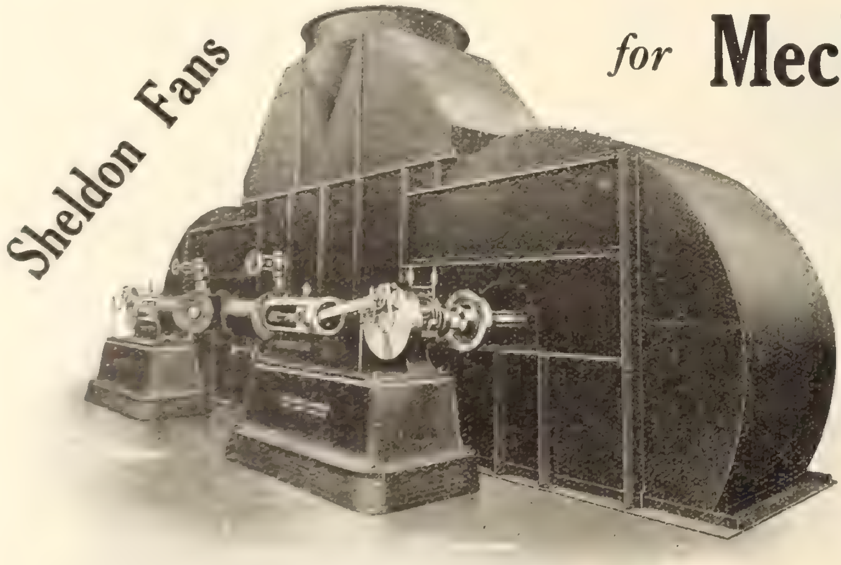

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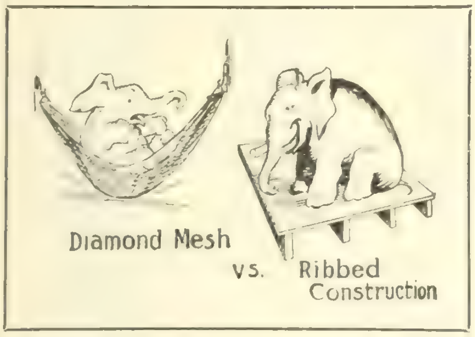

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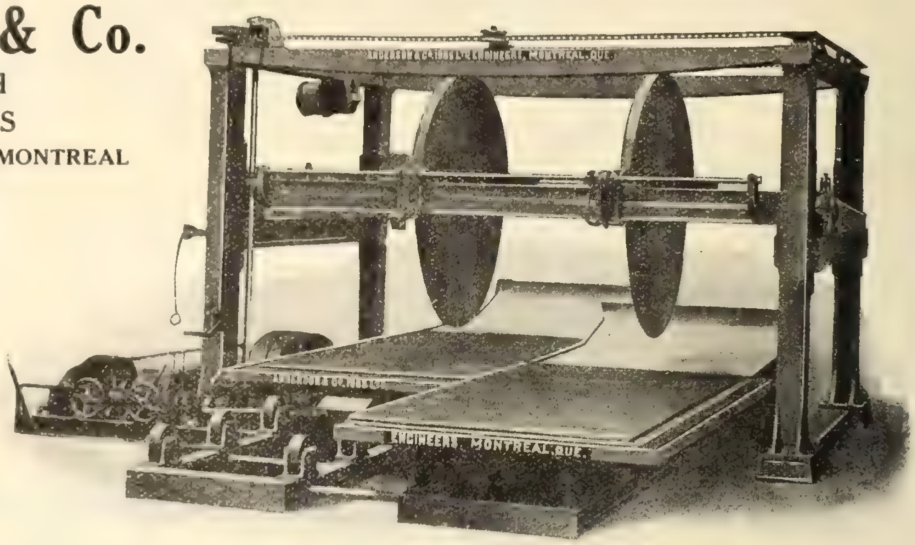

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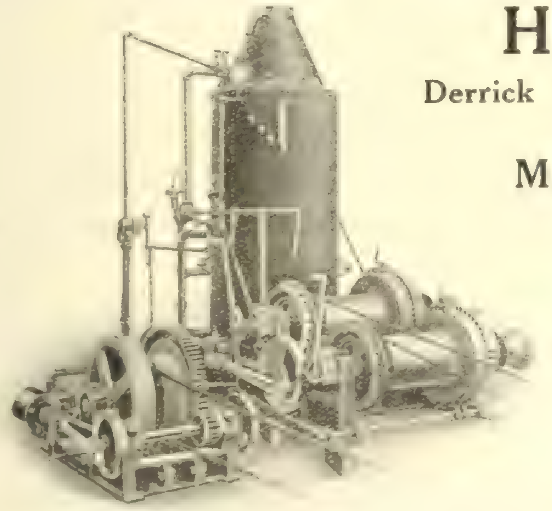

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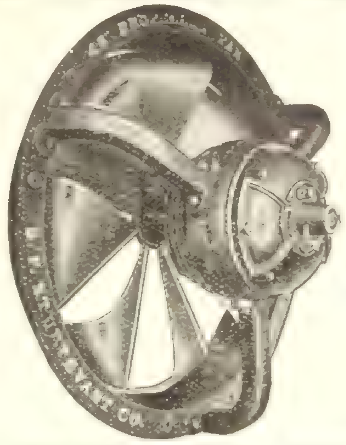

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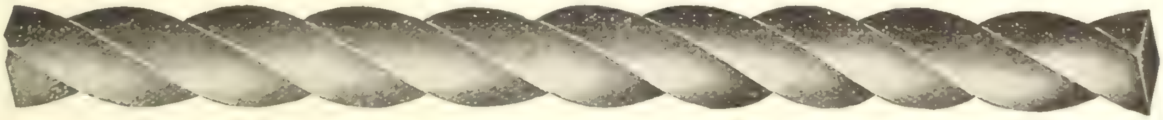

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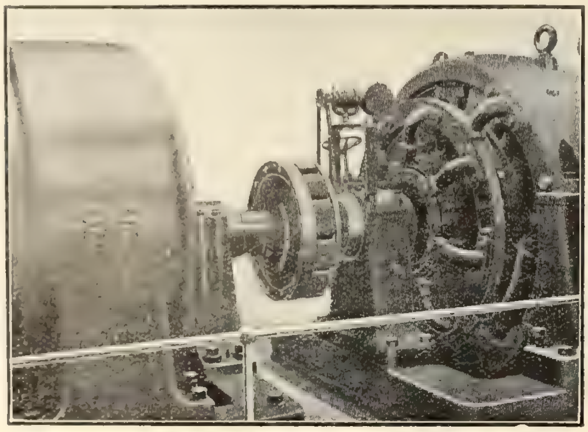

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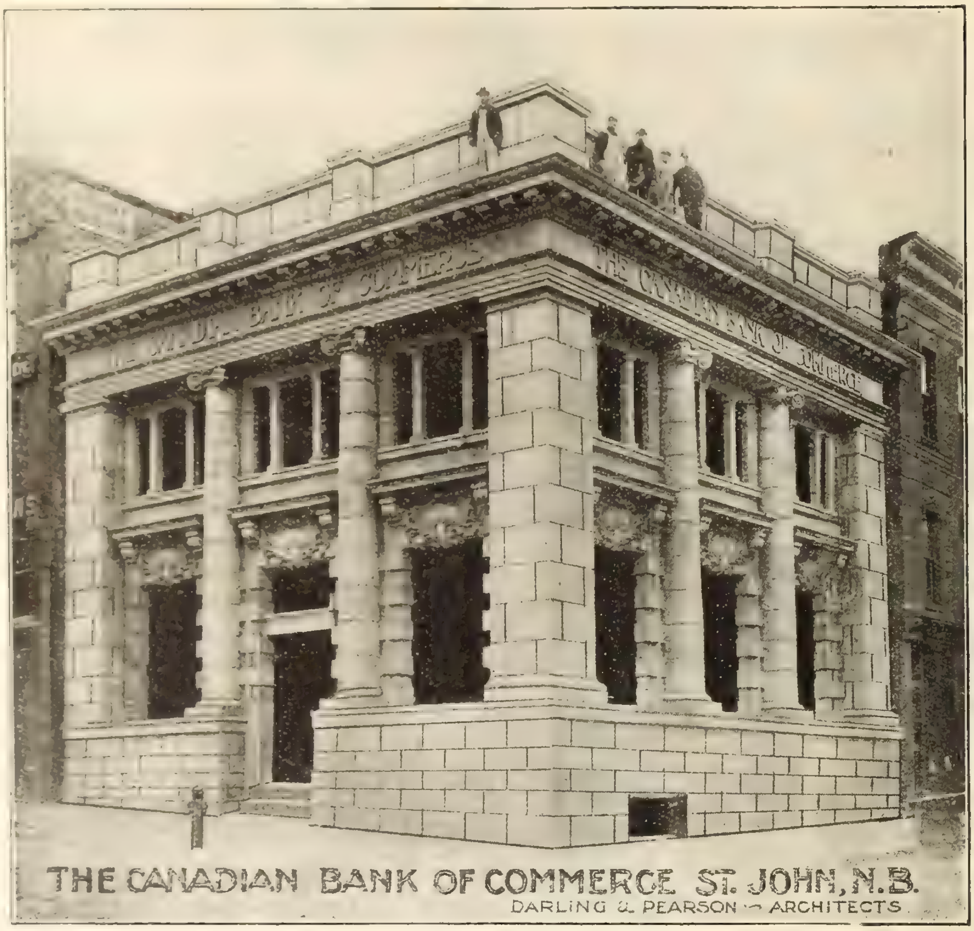

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Street Flushing Machines
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Dumping Wagons

Garbage and Street Cleaning Carts

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Canadian Sales Agents: Francis Hankin & Co., Montreal, Toronto and Vancouver

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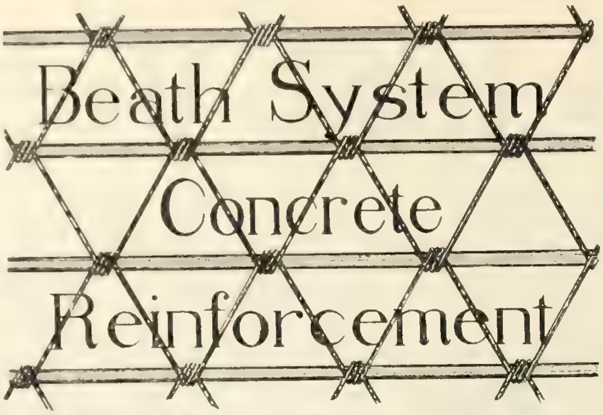
Made of cold drawn mild steel wire, guaranteed tensile strength 90,000 lbs., elastic limit 50,000 lbs. per square inch.

Supplied regularly in rolls 150 ft., 500 ft. and 600 ft. in length, allowing continuous reinforcement over supports. Cut to general length if required.



Detail of Reinforcement. Style No. 23

Main stresses carried on heavy longitudinal or tension members. Diagonal cross wires provided to assist in longitudinal reinforcing and at the same time distribute stresses to main tension members and take care of temperature stresses and strains.

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- No tying or lapping necessary.
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- Higher elastic limits with the same quality of steel due to cold drawing.
- Every ounce of steel tested, as it cannot be cold drawn without showing defects, if any.
- Diagonal cross wires distribute stresses due to concentrated load over a greater area.
- The only design of fabric reinforcement where cross of diagonal wires assists longitudinal or tension members in carrying the load.
- Supplied black or galvanized, but black is recommended owing to its better bond in concrete.

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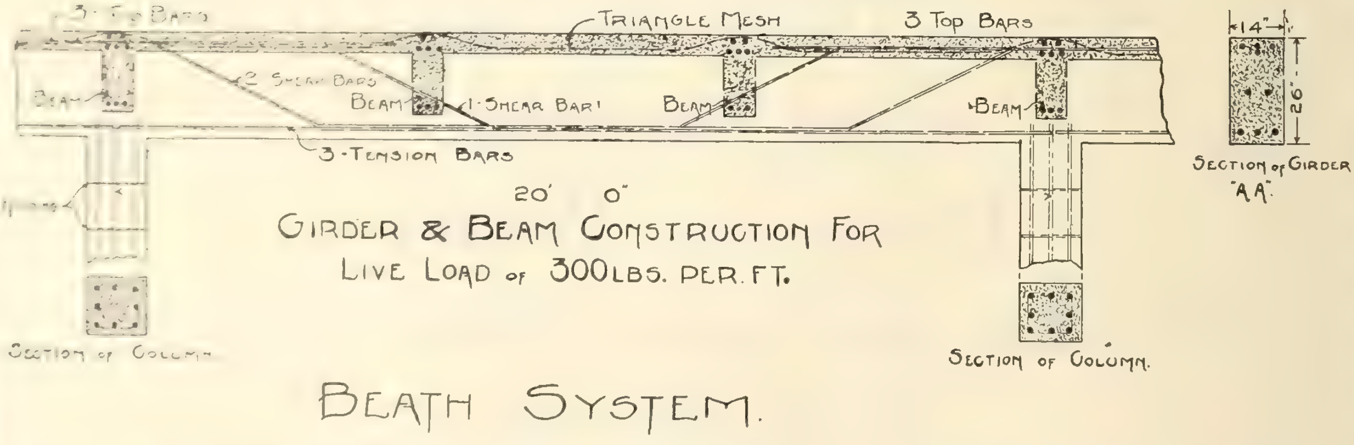

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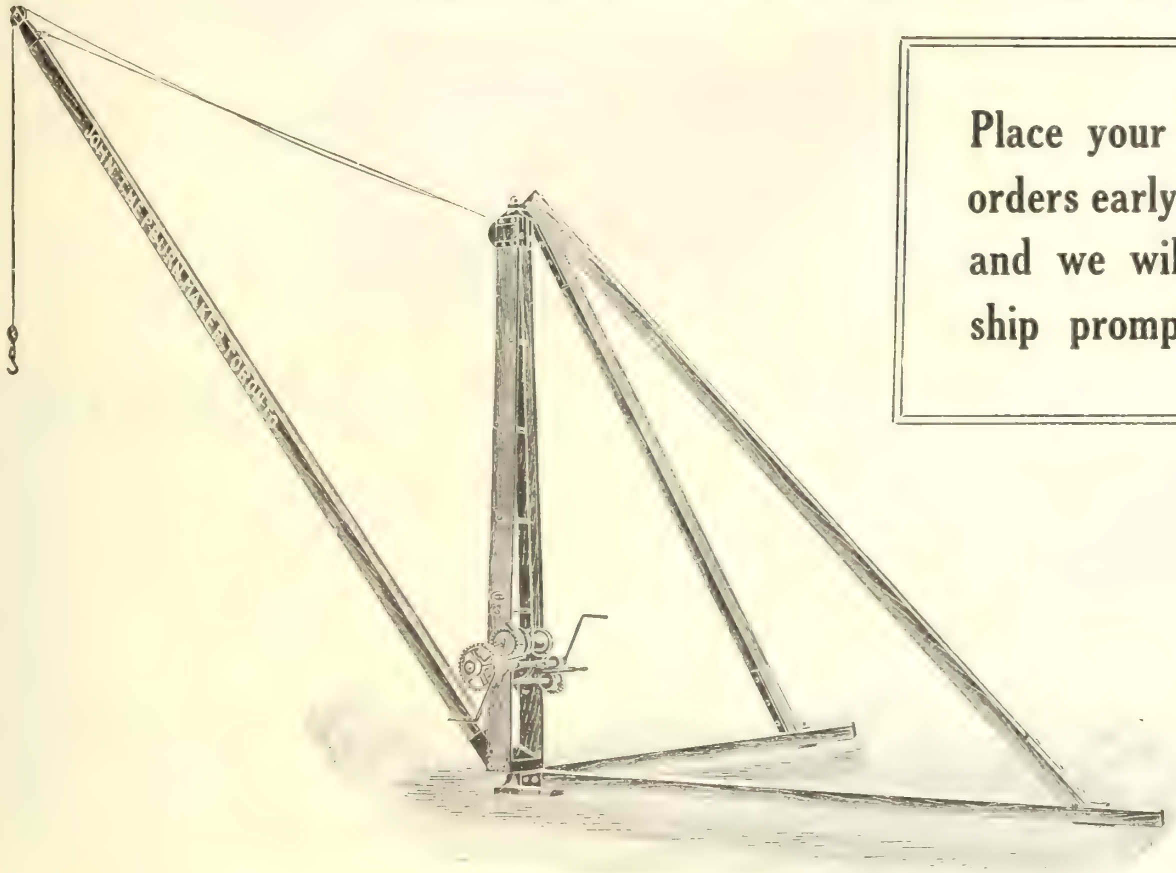
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ALSO FIRE CLAY FACTORY AT ST. JOHNS, P. Q.

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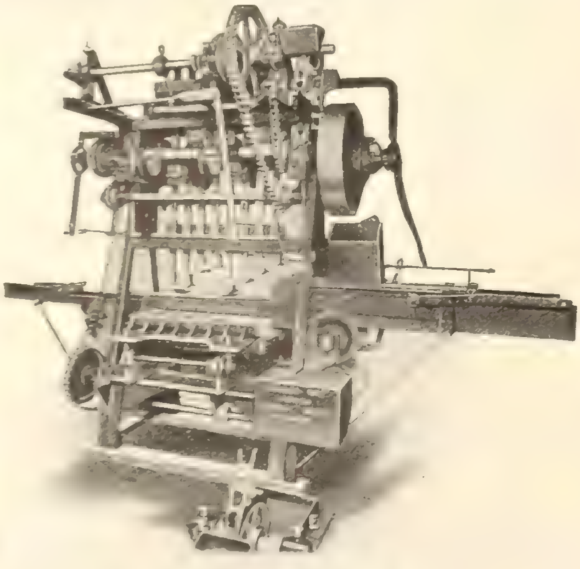
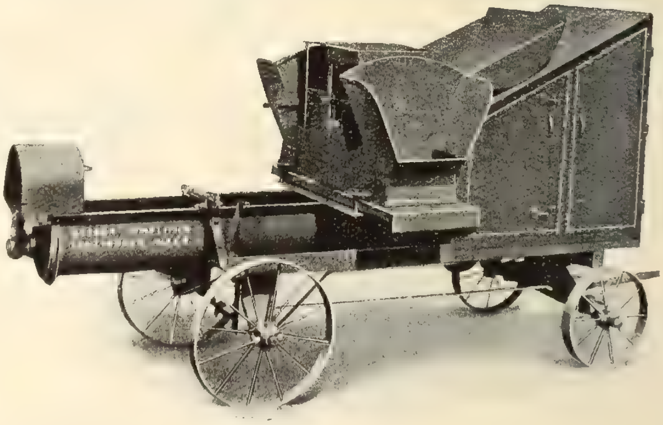
Here are the two Besser machines that make the best cement brick on the market. The Brick machine that will make 30,000 bricks per day—every brick the same.



Besser Power Cement Brick Machine



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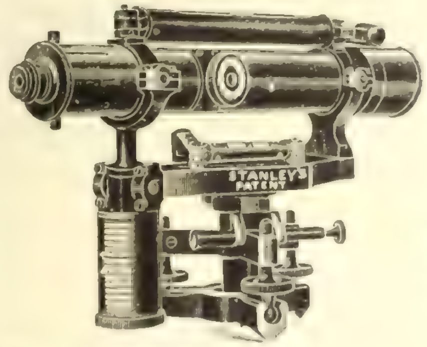

Stanley's Gradiometer saves much time in Railway and Drainage Works. Can be divided to read either ordinary or percentage gradients. Illustrated phamphlet on application.

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Drawing Office Stationery of all kinds supplied on the most favorable terms. A very large stock kept.

Please send for our catalogue "K 91" and compare our prices with those of other *first-class* makers.

We were awarded four Grand Prix and a Gold Medal at the Turin Exhibition, 1911.

W. F. Stanley & Co., Limited
Great Turnstile, Holborn, LONDON, ENGLAND

Anybody Can Make Money With This Mixer

Your men need no be past-masters in concrete to get the very finest results with the "Oshkosh." Any one can produce a smooth well blended mix that is positively inspection-proof. We **guarantee** this. Has few parts and lasts a lifetime. Loads and cleans easily, mixes any material and requires little power. For a mixer that gives real satisfaction, by all means get the

OSHKOSH Mixer

Special Features. Quadruple or Four-Way Mixing Principle; that is, it turns, kneads, pours and flows four times to each drum revolution—efficient **Chain Drive**—Main Sprocket Drum Ring in sections; each instantly replaceable—**Discharge Lever** can be operated from all sides of mixer—**Combination Drive** and **Hoist**—heavy reinforced channel steel **Frame** thick semi-steel **Drum**—rotated on extra large rollers; can be stopped or started full or empty—all parts standardized and fitted to interchange in the field with ordinary tools. In every size demanded; standard or batch hopper or power charger; steam, gasoline or electric power. High grade gasoline engine with multiple disc clutch. Fine horizontal steam engine instead of a cheap vertical. Electric motor of latest approved pattern. **Rigid Guarantee** of absolute satisfaction.

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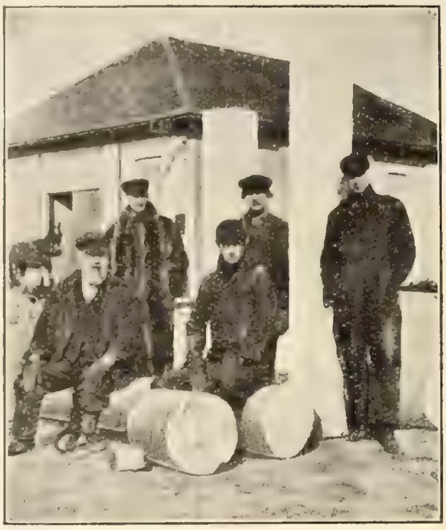

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The 16 in. hard limestone cores shown above were taken out by one of our Type "C" McKiernan-Terry core drills, operated by the Corporation of Winnipeg.
This Drill is capable of boring any size holes up to 30 ins. in diameter.

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Wooden Water Pipe

Galvanized Wire Wound and Continuous Stave Pipe for Water Works, Power, Irrigation, etc.

Withstands 250 lb. working pressure.

Not affected by Frost, Corrosion, Electricity or Acid. Water Works Systems installed. Prompt attention to inquiries.

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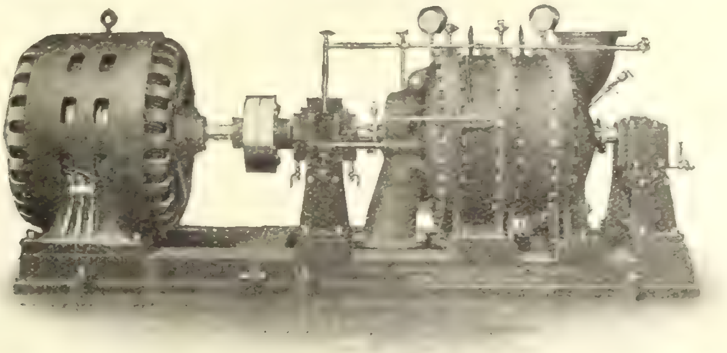
Factory: 550 Pacific St., VANCOUVER, B. C.

TURBINE PUMPS



"INGLIS" Turbine Pumps are Hydraulically self balanced and as an auxiliary a liberal water cooled marine thrust type bearing is used.

Send us your enquiries

The John Inglis Company, Limited

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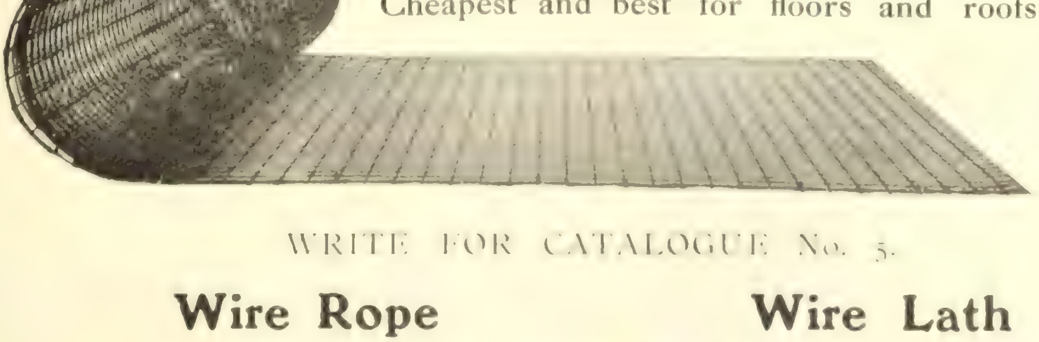
GREENING'S

Steel Wire Reinforcing

Continuous lengths. Any width convenient to handle.
Mesh and size of wire to suit requirements.
Convenient to handle and cheaply applied.
Cheapest and best for floors and roofs.



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Wire Rope **Wire Lath**

MANUFACTURED BY

The B. Greening Wire Co. Limited

HAMILTON, Ont. - **MONTREAL, Que.**

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For Railroad and Municipal Contractors

Are known from coast to coast for their strong construction and durability, and are in use on the largest construction works in the country.

Only the very best materials enter into their manufacture and our trade mark stamped on every shovel is a positive guarantee that goods are as represented.

Our Round Point Socket Strap Plain Black Shovel

The Shovel That Stands The Test

We will send to any contractor, free, express prepaid, upon request, a sample shovel, which will speak for itself. Send also for our illustrated catalogue, showing our full line of Shovels, Spades, Scoops, Draining Tools, etc.

Carried in stock by all leading wholesalers, or direct from the manufacturers

TRADE MARK

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Storage Houses Oil Houses

¶ We have the best possible facility for making all kinds of storage houses of one storey, no matter of what dimensions.

¶ We will undertake to furnish and erect such buildings complete ready for occupancy.

¶ No steel building is too small or too large for us to figure on.

¶ We shall be pleased to furnish estimates and sketches on this class of work at any time. Write us and tell us what you need and we will prepare estimates for you at once.

Cut shows an all-steel building used for storing expensive patterns and dies. The size of this is 18′ x 39′ and it has been doing service for years and gives the same good service as when erected.

The Metal Shingle & Siding Company, Ltd.

Associated with

The A. B. Ormsby Company, Limited

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No. 110 R. I. W. DAMP RESISTING PAINT

Prevents
Cement
Mortar
Stains
on Cut
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Excludes
Dampness

Preserves
Interior
and
Exterior
Surfaces
of Wooden
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Protects
Steel from
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All Tennesee Marble in above building "backed" with No. 110 R. I. W. Paint.

THE R. I. W. DAMP-RESISTING PAINT CO.

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Northwestern Architectural Terra Cotta
High Grade Vitreous Face and Paving Bricks
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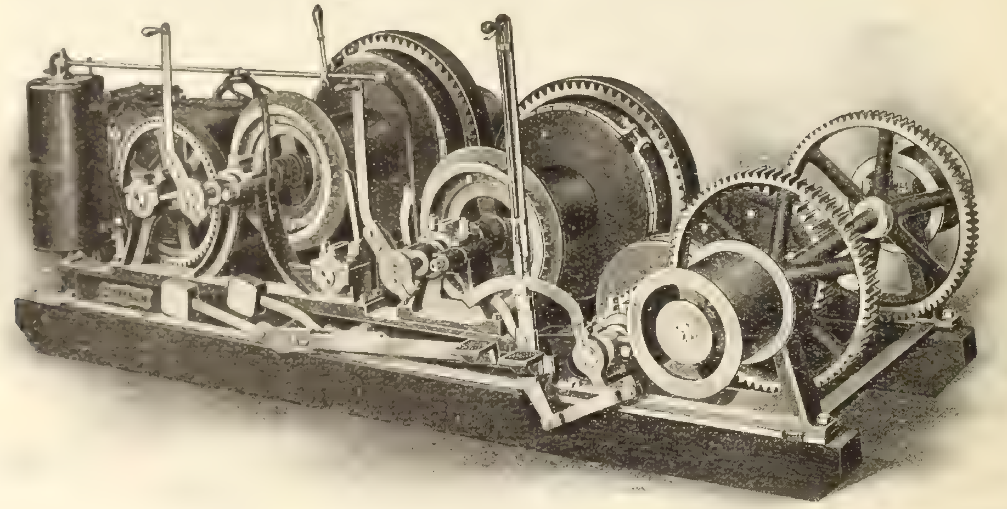
Interlocking and Spanish Roof Tiles
G. & G. Telescopic Hoist
Utility Wall Board
Radial Brick Chimneys
Canadian Patent Scaffold

Office & Showroom - Mail Bldg., Toronto

ELECTRIC
DERRICK HOISTS



Where electric power is available electric Hoists are manifestly superior to steam. There is no trouble or worry in cold weather with steam or water pipes, no boiler troubles, no smoke nuisance; just a smooth quiet running, easily operated, sanitary machine.

An Electric Derrick Hoist is an ever ready, compact, self-contained unit, easily moved, easily located and free from complications.

Either Direct Current or Alternating Current Motors, for a wide range of electrical characteristics, will be furnished and are equipped with water and dust proof street railway type controllers.

Some of the outstanding features of these hoists are their rigid, light and compact construction. All gears are cut from solid metal and the motor is fitted with rawhide pinion.

Special attention has been given to convenient location of levers and brakes.

Boom swing attachment is built independent and may be removed. We are in position to supply

A Wide Range of Sizes and Types of Electric Hoists.

CANADIAN INGERSOLL-RAND COMPANY
LIMITED

COMMERCIAL UNION BUILDING - MONTREAL, CAN.

Sydney Montreal Toronto Cobalt South Porcupine Winnipeg Lethbridge Rossland Vancouver

A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

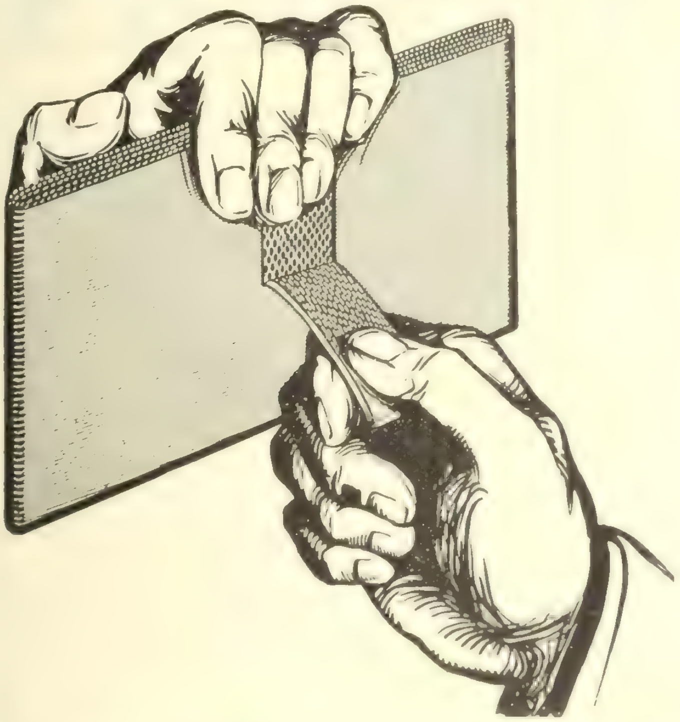
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit—and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS—A TOTAL OF 72,000 FEET

We have just received an order for this quantity of GOODYEAR RUBBER BELTING from one business concern in the west for the equipment of interior elevators. Such an order shows supreme confidence in the quality of GOODYEAR Belting.

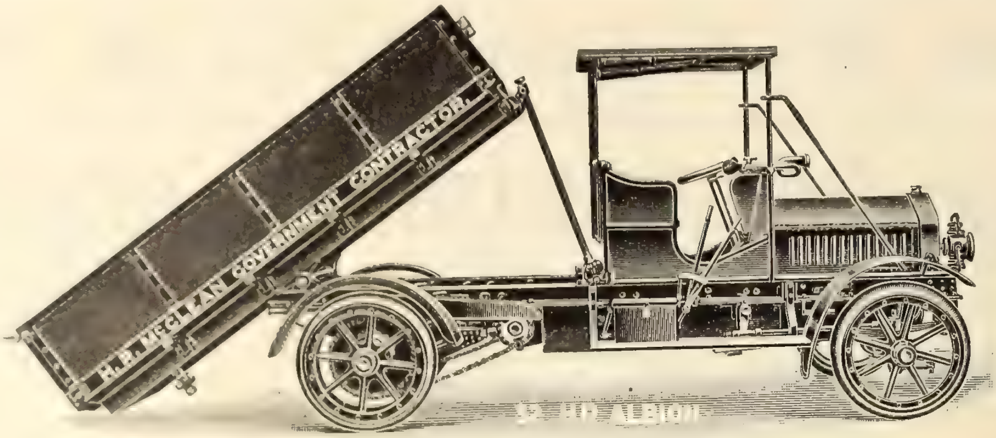
If we have not just the belt you require we will make it for you.

In the choosing of belts our booklet would be of great assistance to you. We supply it free. Write to our nearest branch for one.

The Goodyear Tire and Rubber Company of Canada, Limited

Factory, Bowmanville, Canada

BRANCHES: Victoria, B. C. Vancouver, B. C. Calgary, Alta. Regina, Sask. Winnipeg, Man. London, Ont. Hamilton, Ont. Toronto, Ont. Montreal, Que. St. John, N. B.


H. P. McCLEAN GOVERNMENT CONTRACTOR.
32 H.P. ALBION

Some Reasons Why You Should Buy

ALBION TRUCKS

1. THE ALBION MOTOR CAR COMPANY OF GLASGOW, SCOTLAND, on account of the reliability and economy of their Trucks have become the largest manufacturers of Motor Trucks in the British Empire.

2. TWELVE YEARS' EXPERIENCE OF TRUCK CONSTRUCTION in all parts of the world (sixty trucks in Canada) back of every "Albion."

3. ECONOMY IN FIRST COST. 12½ per cent. or about Five Hundred Dollars on a 3½ ton machine saved by British preference in duty and the machines manufactured where the highest grade of skilled labor and material can be obtained at low rates.

4. Tires of nearly double the size of those supplied on standard American machines, with the consequent large saving in operating cost, as tire maintenance is the chief cost of truck operation.

5. CAST STEEL WHEELS which last forever.

6. EASE OF CONTROL. There is only one lever and two pedals to control the machine. The gears are always in mesh and the engine is equipped with a powerful governor controlled from the driver's seat which enables the truck to be set to run at any speed up to the maximum, thus making the driving of the machine as simple as possible.

The majority of "Albion" Trucks are driven by former horse drivers.

PATENT DRY DISC CLUTCH which protects the mechanism from damage by poor drivers.

PATENT SPRING DRIVE in transmission to protect the tires from wear on rough roads.

7. ALBION SERVICE. WE WILL HAVE DEMONSTRATION TRUCKS AND COMPLETE STOCK OF SPARE PARTS in MONTREAL, TORONTO AND OTTAWA.

8. Recent order from the CANADIAN PACIFIC RAILWAY after report on the design and construction by their engineers.

9. The "ALBION" represents the MAXIMUM VALUE IN FIRST COST and the MINIMUM COST OF UP-KEEP. Let us prove this to you by examining the truck carefully and noting the many features that lead to reliability and long life in its construction. You will find Albion Trucks at all the Motor Shows completely opened up for inspection, as we believe there is no detail that will not bear the closest scrutiny.

See our Exhibit at the Toronto Motor Show, or write for catalogue, particulars and demonstration

Albion Motor Car Co. of Canada

Montreal and Toronto

Complete stocks of spare parts carried in Canada

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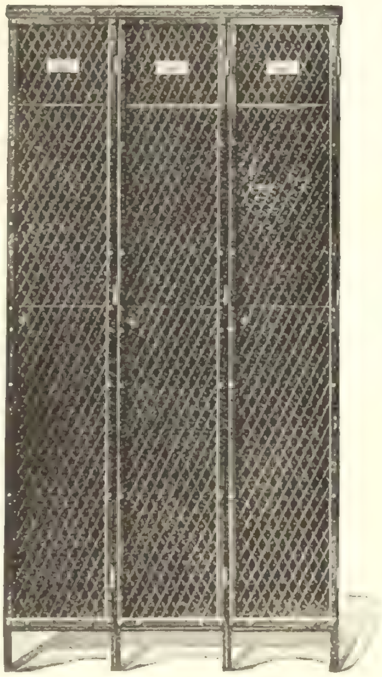
The Rogers Supply Co.

28 King St. West
Telephone Main 4155 Toronto

G.T.R. and C.P.R. Delivery
6 Supply Yards

Prompt Service

'Meadows' Metal Lockers



Make friends because of their substantial construction and unique features. We make several styles and sizes of these lockers. We'll know what you want if you just hint at your requirements.

Send for our illustrated booklet entitled **"Locker Lore"**

GEO. B. MEADOWS

Toronto Wire, Iron and Brass Works Co. Limited
TORONTO, CANADA

IRON AGE

Steel Tray Barrows

With heavy, high-carbon steel trays pressed from one solid sheet. They are fitted with heavy steel wheels, hardwood frames, long handles, and are properly braced to stand rough usage.

We carry a full line of

Drag and Wheel Scrapers

to suit the contractors' requirements. The Drag Scrapers are pressed from a solid sheet of high-carbon steel, all joints and seams being eliminated. They are properly balanced and of standard capacity. The Wheel Scrapers can be furnished with either pressed or square bowl and are fitted with all the latest dumping attachments.

We are headquarters for contractors' Pick and Rooter Ploughs. It will pay you to investigate our line. Write, call or phone.

THE BATEMAN-WILKINSON CO., LIMITED
340 CAMPBELL AVE., TORONTO

RADIAL BRICK CHIMNEYS

Our long and varied experience enables us to arrive at definite and proper conclusions regarding chimney building, and we are ready and willing to give prospective customers the benefit of our experience. We have many chimneys in successful operation throughout Canada and the United States.

Write our nearest office for
Catalogue No. 38.

THE CANADIAN KELLOGG CO.

Limited

MONTREAL TORONTO WINNIPEG
Board of Trade Bldg. 65 Victoria St. Travellers Bldg.
NEW YORK, 50 Church St.

Height 250 ft. Top diameter inside 10 ft. built for Wayagamack Pulp & Paper Co'y, Three Rivers, Que.

The Use in the West of "Medusa" Waterproofing

Fort Garry Hotel, Winnipeg
Architects, Ross & MacFarlane Contractors, Geo. A. Fuller Co., Ltd.
30,000 lbs. "MEDUSA" Waterproofing used in this building

Concrete Made Absolutely Waterproof with

"MEDUSA" WATERPROOFING

The First and Only Genuine waterproofing for concrete.

Beware of Imitations

The very success of "Medusa" Waterproofing has led to the rise of a host of imitations and infringements. These so-called waterproof compounds are of such poor quality that it is necessary to use a proportion four times as large as "Medusa" Waterproofing and then these imitations only produce an **apparent** and **temporary** effect.

The effect of "Medusa" Waterproofing is everlasting and its permanent quality is due to its being absolutely insoluble and unaffected by water even after years of contact.

Acknowledged best in thousands of practical tests in the United States and Europe.

Send for Samples and Prices

Manufactured under Canadian Patent controlled by

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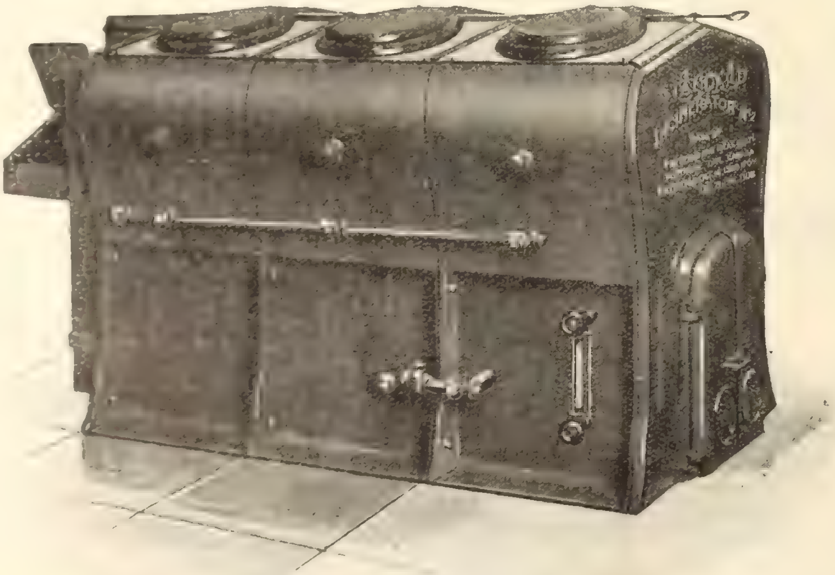
10th Floor, Eastern Townships Bank Bldg., MONTREAL, QUE.



Three Section Incinerator—Type No. 2

Sewage and Garbage Incinerators

In Standard Ideal Incinerators the accumulation of the matter—both solid and liquid—is absolutely sanitary and non-infectious. The system of Incineration is complete—the solid matter being reduced to a small ash and the liquids completely evaporated.

It is important to note that in the latter process the system of drafts is arranged so that the fumes and vapors arising from the accumulation must pass through the fire before reaching the open air. This obviates all obnoxious odours.

The United States Government finally selected this type for the disposal of toilet refuse in its military camps and elsewhere, after trying every other apparatus on the market.

Standard Ideal Incinerators are made in two types:

TYPE No. 1 is intended for the use of 10 persons daily.

TYPE No. 2 is sectional; one section alone having a capacity for 25 persons daily. The addition of extra sections increases their capacity proportionately.

Write for booklet
"INCINERATION AND INCINERATORS.

The Standard Ideal Company Ltd.
PORT HOPE, ONTARIO

Branches: WINNIPEG TORONTO MONTREAL VANCOUVER

ESTABLISHED 1886

Contract Record
and Engineering Review

PUBLISHED EACH WEDNESDAY BY
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HUGH C. MacLEAN, Winnipeg, President
THOMAS S. YOUNG, General Manager.

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Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
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Alphabetical Index of Advertisers
Page 16

Vol. 28 March 12, 1913 No. 11

Arguments in Favor of a Uniform Building Code

QUITE a number of excellent points in favor of establishing a uniform building code were made by Mr. H. A. Sylvestre, Superintendent of the Calgary Building Department, at the recent annual convention of the Canadian National Association of Builders' Exchanges. The plea that was made for the adoption of a uniform code by the cities and towns of the whole North American continent has much to commend it from the standpoint of economy in construction, although we cannot but think that various difficulties would arise in attempting to put such a code into practice. One would naturally think that the climatic difference between, say, Vancouver and Winnipeg would call for appreciable differences in building requirements, but as Mr. Sylvestre points out, both cities want their buildings "safe structurally, safe from the viewpoint of fire, and safe from the viewpoint of sanitation."

Such a code as is required would have to be an expert combination of the best experience on the continent—one which, while it would stand unequivocally for the outstanding principles of construction in the various departments of building and engineering, would permit a common-sense interpretation of its requirements in less important matters. The advocates of a uniform code cite the example of Great Britain, where the regulations of many towns are based upon a model code contained within the Public Health Act. Undoubtedly, in Canada, the community at large would benefit by such a code in the respect that it would practically eliminate irresponsible experimental work, both with new materials and new constructional methods. All such work would be done under the supervision of a Uniform Code Commission, who would furnish results and legislate according to those results.

Another point in favor of a uniform code is that it would tend to enlarge the sphere of operations. The Montreal or Toronto architect would draw up his plans for a building at Winnipeg, Calgary or Vancouver and send them out without fear of unfavorable criticism of detail. The same thing would apply to contractors. Their operations would not be restricted to the practice followed in any particular section of the country. Then the artisan would benefit in that he would not have to adapt himself to different workmanship in different cities.

A favorable argument adduced is bound up in the subject of technical training. It is argued that on account of lack of uniformity in the constructional requirements, teachers in the various cities are obliged to qualify their statements and leave room for doubt where none should properly exist.

As illustrating the ill-considered requirements of large cities, Calgary may be exampled in its requirement of a 17-inch brick wall, where under the same conditions a neighboring city requires only a 13-inch brick wall. Here we have either economic waste on the one hand or dangerous construction on the other. Either is a transgression of good building practice. The design of reinforced concrete is cited as another example. One city will insist on concrete carrying only 500 pounds a square inch; another will allow 700. One would certainly regard reinforced concrete the same in Vancouver as in Quebec—then why should not the allowable load be the same?

In the matter of sanitation and uniform restrictions which would insure adequate air and sunlight, the standard code has a strong talking point. At present there is no general provision of a uniform building line in the residential districts, adequate sanitary conveniences in the home and in the workshop, or for proper heating and ventilation. And it is such provisions which will develop to the full the health and morals of our citizens, and bring out the best that is in our race.

Last but not least in this argument is the advantage from the standpoint of fire protection. Under the defective codes of some of our smaller towns, the flimsiest construction is permitted. This is resulting in an appalling loss of both life and property. In this connection Mr. Sylvester says: "It is of interest to know that one-ninth of all our fires are due to the accumulation of rubbish and that over forty per cent. are from preventible causes, of which the principal is faulty construction." Apart from the responsibility of permitting this continued loss of life and property, it would appear to be a matter of financial economy to erect fireproof structures. In nine cases out of ten the interest on the additional investment is more than compensated by decreased insurance rates and increased revenue.

These are the outstanding claims made in favor of a uniform building code. The subject is one which we believe can be discussed very profitably by readers of this journal.

An original idea was carried out by the promoters of the Clay Products Exposition at Chicago. At the time of writing, this exhibition is now in progress. Manufacturers throughout Canada and the United States were invited to send at least one brick to the Show to be applied in the construction of an all-brick house. As a result of this invitation the Exposition [illegible] deluged with bricks from all parts of America. The mail carriers at first took the matter as a joke, but afterwards, wearied by the tons of brick that they had been obliged to take into the Coliseum, they threatened to strike. The labor unions also objected to the employment of the mail-carriers as hod-carriers.

The Profit-Sharing Plan

AT a recent dinner in Philadelphia, at which were gathered together the members, associates and employees of a leading architectural firm, the senior member of the firm gave a brief address explaining the profit-sharing plan which had been decided upon by the firm.

The division of the profits is upon a two-fold basis: a certain amount is set aside from the profits in which all the employees share equally, irrespective of their salaries. There is also a division of an additional amount based upon the proportion which each employee's salary bears to the total amount of salaries paid. It was announced that the past year had been the most successful and involved the largest amount of business that the firm had ever handled, and stated that this result was due, in a great measure, to the efficiency and co-operation of the employees, which it was their desire to recognize in a substantial manner.

Profit-sharing has been practised by this firm in the past to the extent of sharing a certain portion of the net profits with the heads of the several departments, which has proved so satisfactory that the firm decided to extend the plan to all of its employees, from the highest to the lowest, believing thereby to obtain an increased co-operation and efficiency throughout their entire force. No pretense is made by the firm that the profit-sharing plan is a form of philanthropy. The firm believes that this is the first application of profit-sharing on such a general scale that has been made in the architectural and engineering professions anywhere.

The Brick Situation in Toronto and District

SOME little time ago publicity was given to the statement that there would undoubtedly be a brick famine in Toronto during the coming season and it was suggested that the Government should consider the matter of removing the duty from the U.S. product. Since then we have made a careful investigation of existing conditions with the result that we are "between the devil and the deep sea," although inclined to believe that in spite of the enterprising activity of the brick interests, the building activities of the province and the consequent demand for brick are outstripping the supply.

In launching upon a consideration of this subject we are prepared to concede points to both sides; indeed, we have no choice, for we have heard both sides of the argument. In the first place it would appear that some of the statements which appeared recently in the Toronto press are misleading, in that the prices and conditions cited apply only to small orders which do not reflect the general trade tendency. The manufacturers claim that they are able to take care of all legitimate demands and that the greatest complaint is emanating from the speculative builder whose finances are often open to question. In support of this they state that without a single exception none of the large building contracts of last year was held up for want of brick. The large contracting concerns appear to have little to say on this score, although contradictory statements have been received.

We have before us a number of communications both from manufacturers and contractors. These were received in reply to a letter in which we asked for an expression of opinion as to (1) what extent the manufacturers would be able to cope with the demand this season; (2) what stocks were held over and otherwise available; (3) whether manufacturing facilities were improving in proportion to the demand; (4) whether U.S. brick would ever become a factor of competition.

The first response is from a leading contractor who complains that the community experienced considerable loss last season owing to the inability of the manufacturers to give prompt service. The writer continues:

> "With the prospect of a record year of building we fail to see how the manufacturers are going to cope with the demand.
>
> "The open season allowed building operations to extend through January, using up the bulk of the bricks on hand. In our opinion the new plants now complete, or nearly so, would take care of the normal increase only. Any demand beyond this must be supplied from outside sources.
>
> "The lowering of the duty on cement last summer saved the situation as far as cement was concerned. The same policy applied to bricks should have a similar result. Although the price of bricks might not be reduced, the situation would be relieved and a famine averted."

The views expressed by the writer of the above letter are not shared by another large building and contracting firm, who write us:

> "As far as our enquiries have extended, we believe that the situation will be somewhat easier than in the past season, unless weather conditions should fail, as they did then. We know of at least two large concerns whose output last year was considerably lessened for reasons not necessary to state here but which we understand have been overcome. We are also advised of several new plants which will be prepared to market in the city in the near future."

Contrasted with the views expressed in the above letters are the statements made by the manufacturers themselves. Of six replies received by this journal and reproduced below, only in one is there any apprehension as to the ability of the manufacturers to cope with the demand in 1913. We are withholding the signatures from these letters for the reason that we wish to assume the full onus of anything of a controversial nature.

Facilities Improving

Editor Contract Record:

I see no reason to doubt why the manufacturers of brick in this city should not be able to cope with the demand this season, considering the number of new plants that are being put up. Also, you must take into consideration the fact that probably money will be quite tight this season, therefore curtailing many proposed building operations. I do not imagine that there is any great amount of stock held over, but should say that this is due largely to the fact that the greatest majority of plants in Toronto are what might be termed summer plants.

The Lytle Construction Company are putting up their plant at Cooksville, and several other large plants are building in the near vicinity, and it appears that manufacturing facilities are improving proportionately to the increase in building.

I am inclined to think that the United States brick, with the duty removed, could easily become a factor of competition in the Canadian market. The fact of their larger experience in the past years and their machinery facilities for manufacturing all kinds of specialized brick must be taken into consideration. However, I have no doubt that in the near future Canada will be able to manufacture brick that are as good in every particular and as cheap as our next door neighbors can put out.

Yours truly,

Buffalo Brick Estimated to Cost $15.75

Editor Contract Record:

We think that the manufacturers will be able to supply all demands fully as well as last season, if not better. No doubt there will be a greater demand, but all the plants have been increasing their capacity in anticipation of the demand, and it must be remembered, also, that new brick plants are starting up all over the country and close to Toronto. One concern alone will be starting shortly with a capacity of over one quarter of a million daily, and it is quite possible that in twelve months the supply will more than equal the demand.

As to stock of brick on hand in the yards, for years there has been no stock to speak of in February and March, as it costs a considerable amount of money to pile up and re-handle.

In regard to taking off of the duty and letting American bricks in, our opinion is that it would not affect Toronto in the least. Buffalo hard builders, fit to stand the shipping, are quoted at $7.50 at the yard. The size is about one-fifth smaller than ours, so that you will have to add that one-fifth, viz., $1.50, to bring them to our size. The freight rate is ten cents, and for a five and one-half pound brick means $5.50. We will say $1.25 for teaming to the building, and so arrive at $15.75, while the bricks in Toronto have been selling all the way from $11.00 to $14.00, according to quality.

Yours very truly,

A Point For The Railways

Editor Contract Record:

We do not believe that there is any necessity for the proposed removal of the duty on U.S. brick. Conditions last year were very unusual. The severe winter prevented almost every plant in Canada from running and coupled with the rainy season it made matters much worse than they should have been. In a great many cases the tie-up on building was chiefly due to stone, although brick got the blame for most of it.

Most manufacturers are enlarging their plants and a great number of new ones are starting up. The contractors are buying large quantities of bricks and piling them up ready for use when spring opens out.

We believe that the removal of the duty on U.S. bricks would put a large number of smaller plants near the border out of business. It would not be such a factor in the neighbourhood of Toronto. Canada is quite able to take care of the buildings going up without removing this duty.

The railways are quite an important factor in this question. They will have to consider the question of supplying cars to take care of the largely increased output of the different plants in this part of the country.

Yours truly,

A Manufacturer's Admissions

Editor Contract Record:

In answer to the queries contained in your recent letter I beg to submit the following as a candid opinion on the points under discussion:

(1) I do not think that any manufacturer of brick will be able to supply one-half of the business offered him.

(2) There are no stocks of brick held over or available to-day. Every yard is sold for months ahead.

(3) The manufacturing facilities are improving proportionately now, but the new plants and extensions will afford no relief until the fall of this year, as many will not be running before June or July.

(4) Brick manufactured in the United States can hardly become a competing factor. This is on account of duty, freight rates, inferior quality in many cases, difference in size, and breakage and rubbing in transportation.

Yours sincerely,

Hamilton Fairly Well Equipped

Editor Contract Record:

With the many new brick plants put in this winter and the enlarging of many of the old plants, we cannot seen any reason why there should not be ample brick manufactured to meet the demands. There have been a number of new plants started in the far West and this will be a factor in stopping the drain on the Ontario brick yards.

There has been a considerable quantity of fancy brick shipped to this side from the United States. The people who want them are creating this agitation so that they can bring this class of brick in duty free.

As far as we know Hamilton is fairly well supplied, and with the extension of many of the plants here we do not see where the shortage comes in. To all our large contractors we are making the same prices for 1913 as for 1912.

Yours truly,

All Orders Filled Promptly So Far

Editor Contract Record:

We believe that the Canadian brick manufacturers will be able to supply all the bricks required this year for building. There are so many new factories starting that the quantity made in excess of last year will be very great. Our company carried two million bricks over from last season, and we have been in a position to fill all orders promptly to date.

We are confident that it would be a great mistake for the government to take the duty off U. S. brick.

Yours truly,

* * *

We cannot think that the proposal to remove the duty from U.S. brick is worthy of consideration. It is generally conceded that the U.S. product is inferior to the Canadian product, and this would apply particularly to the brick manufactured in Toronto and district, than which probably there is none finer made on the continent. Even though it were possible to market U.S. brick in Toronto upon a profitable basis after paying freight and teaming charges, the local architect could never accept it either on account of grade or size, or of both. The removal of the duty would only just enable the lowest grades to enter the competition from the standpoint of price. In the higher grades the Canadian manufacturers have nothing to fear. The Don Valley Brick Works, for instance, are already doing a large and increasing trade with U.S. cities.

Some allowance must be made for our contracting friend, who, after reading this article, remarks: "This kind of thing is all very well, but it does not solve the problem of getting brick." To this we can only reply that no such problem has ever yet been solved by discussion. A discussion, however, leads the way and if by means thereof we are enabled to bring about a consideration of remedial measures, which in practice will redound to the benefit of constructional operations at large and not to one restricted field, we shall have accomplished a good purpose.

In conclusion, we can only say that the contractor conducting operations on a small scale, and also the speculative builder, must have consideration and be enabled to carry out their operations profitably if Canada is to have adequate and proportionate development. If our manufacturers are catering only for the large concerns who are financially able to undertake contracts for three or four large public buildings at the same time, the small contractor will soon be out of business, for he will find it impossible to make advantageous terms in buying comparatively small quantities.

Possibly the situation will right itself in time, for there is growing recognition of the opportunities afforded for profitable brick-making in Canada. Not only are new plants being built each season, but these are being built on such a scale that existing plants must needs extend if they desire to remain a factor of competition. In the meantime, can any practical remedy be found? That is the question.

An Important Branch of Municipal Work

THE construction of tile pipe sewers is, without doubt, the least spectacular work which municipal engineers are called upon to do, says The Engineering Record, commenting editorially upon an article by Mr. W. W. Brigden, reproduced in this issue. The planning and laying of small sewers resolves itself merely into a matter of putting together lines and grade so as to secure a gravity flow at proper velocity and calls for no unusual amount of imagination or creative ability. When it is completed there stands forth no visible monument to the skill of the builder, for everything is burried 5 or 10 ft under ground. These conditions generally tend to make the attitude of sewer constructors one of tolerance rather than enthusiastic interest, and as a consequence many sewerage systems are poorly designed and improperly built because of lack of proper attention. That an engineer is justified in devoting his best efforts to the construction of small sewers is made clear in the article by Mr. Brigden. There is a field for the exercise of care and judgment in this class of work, and the proper laying of small pipe need not be the cut and dried proposition which it is often assumed to be. The article referred to contains many useful hints, construction kinks which expedite the work and sound advice resulting from an experience of many years; it should be of particular interest to the engineer in charge of public works in medium-sized towns.

Everyone who is familiar with pipe sewers appreciates the importance of tight joints between successsive lengths of pipe. Poor joints admit ground-water, which greatly reduces the capacity of the line for handling domestic sewage, and allow roots to enter into the conduits, obstruct the flow and sometimes split the pipe. Tree roots seem to be able to discover even the minutest openings in a sewer joint with a precision as unerring as that of a trained bird dog pointing a covey of quail. If an attempt is made to skimp on the amount of cement used in the joint the result is generally the production of a sieve instead of an effective barrier to the entrance or exit of water.

When a decision to build sewers has been reached the engineer must select the materials of construction. Vitrified clay, brick or concrete, separately molded or cast in place, all have been used extensively and Mr. Brigden tells of his experiences with these several materials. For the smallest diameters he prefers tile pipe, but as the size increases concrete or brick should be selected. There are on the market several types of molded concrete pipes which are particularly adapted to construction in wet trenches.

A great deal of extravagance in sewer contracts results from failure to drive and pull wooden sheeting carefully so that it may be used over and over again. Sheeting of improper length or cross-section is also a frequent source of added expense and trouble. Yellow pine planks, handled according to the methods described in the article, can be made to last, it is said, for three or four working seasons, for precautions are taken in driving to protect the tops of the timbers with malleable iron caps and splitting at the points is prevented by iron staples.

Cold weather always involves special methods where concrete work is concerned and at Battle Creek the sewer department has an outfit of heaters for the sand, gravel and water. Where possible, concreting in cold weather should be avoided as it increases the labor cost from 10 to 20 per cent. Often, however, construction cannot be deferred until spring, and in this event it is necessary to thaw out the ground by building large fires, to place some form of protective covering over the concrete and to maintain a uniform temperature within the sewer by placing lighted lamps at intervals along the bottom.

Veteran municipal engineers may not discover anything new in the recital of the experiences in sewer construction at Battle Creek, but the younger men in charge of municipal work will find the time given to reading the article well spent.

Grenadier Guards Armory, Montreal

PLANS for an armory for the 1st Grenadier Guards, at the corner of Esplanade avenue and Rachel street, Montreal, have been drawn up by Messrs. MacVicar & Heriot, architects, Union avenue, Montreal. The building will have a frontage of 126 feet on Esplanade avenue and a depth of 169 feet on Rachel street. The material for the exterior will be red brick, with light stone dressings. The front and rear portions of the building will be two storeys in height. The front portion will contain the orderly room, commanding officer and officers' mess, surgeons' rooms, paymaster's stores, with the necessary lavatories and locker rooms. These rooms will be located on the ground floor. On the first floor will be located the officers' mess and kitchen service for same. On the ground floor of the rear portion of the building will be located the eight company rooms, each thirteen feet wide and twenty-five feet in length. The first floor will contain the sergeants' mess, kitchen, etc., and separate rooms for the sergeant-major and stretcher bearer section.

The drill hall, which will be placed between the front and rear wings, will have a floor area of 11,500 feet. In the basement will be located the lavatories and shower baths for the men, billiard room sufficiently large to accommodate three tables, bowling alley, shooting gallery, and a large room to be used as a reading room or other recreative purposes, and a band room. The basement will also contain a store room for each company, the caretaker's quarters, furnace room and storage for fuel.

Relations of the Architect and Contractor

By G. M. Lang, Architect, Calgary.

PERHAPS the chronological order will be the proper one in which to take up and consider these relations. We find the architect and contractor in their earliest contact one with the other at the time tenders are called. In the West, the practice is to give out copies of the plans and specifications from which the contractor makes up his estimate of cost and submits his tender. I fear I shall be considered somewhat too conservative when I say that although I follow this practice, I do not consider it the best plan. I believe we should find a much smaller spread between the highest and lowest tenders if a different practice were followed. I think that competent quantity surveyors should take off the quantities and guarantee their correctness, then each architect should have a room in which contractors could examine the plans and specifications and price the material where the architect could be consulted at any moment as to any point not quite clear to the contractor. Tenders should be at the place designated at the time called for. The architect owes it to the contractors bidding that no tender be received after the time mentioned.

A tender having been accepted, the next stage is the contract. In Alberta this presents small difficulty, for after much negotiation a uniform form of contract has been agreed upon between the Alberta Association of Architects and the Provincial Association of Builders' Exchanges. This contract is a model that I can confidently recommend. It is fair to both parties. The contract being signed, the attitude of the architect and contractor become, to a certain extent, antagonistic, and properly so. The architect is employed by the owner to see the contract properly carried out. The contractor wants to make a reasonable profit out of the execution of the contract. When the architect is a man of sufficient practical experience and has breadth of mind enough to realize that he occupies the position of a judge between the parties and that it is his duty, although employed and paid by the owner, to hold the balance just and fair between the parties, there will be no difficulty if the contractor be actuated by right motives. I have sometimes heard men just breaking into the contracting business find fault with the usual clause in building contracts that the architect's ruling shall be final and binding on both parties. Who, tell me, is best fitted to say finally what is meant by a plan or specification, if not the man who made it? The time to clear up obscure questions, if there are any, is when the tenders are being prepared.

In the matter of progress estimates much friction would be avoided if the contractor would hand in to the architect a detailed estimate of the whole work at the start. Then when he asks for his fortnightly or monthly estimate, as the case may be, he would be in a position to show that he was entitled to a just proportion of the contract at that stage, whereas in the absence of such a detailed estimate the architect may be inclined to hold back more than necessary to complete the work and thus perhaps embarrass the contractor at the bank.

It is the duty of the architect to exercise such supervision of the work that any mistake or misunderstanding shall not go so far as to entail great loss to the contractor. Any oversight should be pointed out at once and rectified.

The Alberta contract contains a clause which provides for the issue of the final certificate, even though some small details are incomplete. This is a good clause and should remove a fruitful source of trouble between the architect and contractor. Generally speaking, the final certificate stage should be reached without serious friction between the parties. Each must remember that the other has his rights. Sometimes, with the best of intentions on both sides, litigation will ensue, and here let me emphasize as strongly as possible—and I am speaking with the accumulated experience of nearly forty years in building—that it is better to seetle by arbitration than to go to court.

Use of the Oxy-Acetylyne Flame

Cutting the steel wreckage of a large building with the oxy-acetylene flame was recently accomplished quickly for the Carnegie Steel Company in Baltimore, Md. The building was destroyed by fire January 2, 1913. After the fire the steel frame was a mass of buckled and twisted members, largely made up of 10 in. steel channels. The plant installed for cutting the wreckage was a No. 3 T oxyacetylene welding and cutting plant manufactured by the Alexander Milburn Company. It was mounted on a truck to facilitate moving, and 50 ft. lengths of hose were employed, thus giving a considerable range for each position of the truck. By its use one operator and helper with a single torch were enabled to cut up the iron into movable lengths faster than a force of five men could load it on rail trucks and take it away.

The city engineer of Vancouver, B.C., reports that during 1912 they found it possible to obtain better prices for street paving than formerly, and also to induce large contractors to locate paving plants in the city, by combining a considerable number of separate streets into one contract, and thus greatly increasing the yardage on which bids were received. The price of asphaltic mixture for pavements was reduced 13 per cent, below the figures of 1911, notwithstanding that the cost of labor had increased, the wage on all civic contracts having advanced from 28 cents to 37½ cents per hour.

An authority on the subject says: "Never patch a dry piece of concrete and then let the finish dry out. You cannot get a hard surface without plenty of water, and keeping it wet for at least a week and keeping heat off for that length of time

The Canadian Society of Civil Engineers

Since the publication of our last issue, a number of interesting communications relating to the C.S.C.E. discussion have been received. These letters, which are reproduced below, include an interesting statement of the views of another past president, a man of particularly ripe experience in society work, namely, Lt.-Col. Anderson, C.M.G., Chief Engineer of the Department of Marine and Fisheries, at Ottawa. A general tone is lent to the discussion by the fact that of the other letters received two are from municipal engineers and one from a consulting engineer. Those of our readers who may notice this discussion for the first time and who may desire to submit their views for publication, we would refer to the editorial article, "The Montreal Convention," published on page 41 of our issue of February 5; to the letters in criticism thereof published on pages 40-44 of our issue of February 26, and to the two letters published on page 67 of our issue of March 5.

A Past-President's Views

Ottawa, February 28, 1913.

Editor Contract Record:

In considering criticism one must not judge always by surface indications. Frank criticism, inspired by experience, and given with a view of bettering existing conditions, is always to be welcomed. Criticism which is intended to hurt and destroy, merely to gratify some personal disappointment, is usually vicious and always ill-natured. From what I know of the Society's work I feel sure that some of the fault-finding indulged in at the annual meeting, was of the latter type.

I cannot understand your position in regard to the Annual report. In one sentence you claim that it is too long; in the next you object that 22 out of 26 pages are taken up with lists and a financial statement. Surely in all proceedings of similar societies it is necessary to record donations and publish a balance sheet. Practically, the more successful the year has been the less there is to record. The touchstone of the Society's usefulness is not to be found in annual reports, but in the published papers recording the work of the individual members, while a great deal of the good done by the Society is in establishing a camaraderie that cannot be put on paper at all.

There is no question that it would be an advantage to the Society if we could secure a secretary whose whole time would be devoted to its interests, provided we could find the right man, but right men, with some engineering knowledge, good address, and editorial experience, seem to be as rare as white crows, and meantime we are fortunate in having the partial service of so able and experienced an official as Professor McLeod.

You may record me as being inflexibly opposed to any idea of Provincial Societies. What we require as engineers is the strongest possible central organization as one body. Provincial Societies would introduce the very evils that our medical men are now struggling with endless trouble to eradicate. The present organization of the Canadian Society of Civil Engineers gives all the local facilities requisite by providing for branches, and the British Columbia members would be ill-advised to depart from that system. If necessary branches could be formed separately at Vancouver and Victoria—but no provincial bodies, if you value the highest development of the profession. The main Society is striving consistently and steadily to raise the standard of qualifications. Would provincial branches do as much? Our branch system is working most satisfactorily, and the Ottawa branch at least finds no disposition on the part of the parent society to control its activities—neither would Vancouver or Victoria.

I believe that the present system of electing councillors is not probably the best possible, but probably the growing power of the local branches will eventually place the selection of the men for the several districts in their hands. It is desirable to have an infusion of new young blood every year, provided there are enough experienced councillors left to point out the traps that always exist for the unwary. The suggestion to appoint young men on the several working committees seems practical, and might very well be tried, especially on a library committee.

The council should be supported in raising the standard of qualification required for membership, so that the letters M. Can. Soc. C. E. shall be the same certificate of competency as the letters M. Inst. C. E. We are working in that direction, and should help to that end. When this has been accomplished it will be easier for the Society to ask that only its members should be officially recognized.

I am not in sympathy with the proposition to raise the fees. Every organization on this continent seems to desire to keep pace with the current extravagant expenditure, and members residing far from headquarters are complaining that their fees are already too high for all the benefits they receive. With careful management the Society can be run on its present income.

The question of the employment of alien engineers is a very difficult one to handle. If the Society protested it might be charged that it was inspired by the narrowest and most selfish of motives, and yet it is manifest that there should be in some way, by some authority, a limit to the practice. Part of the trouble is expressed in the old truism that a prophet is without honour in his own country, part of it is due to the fact that the best Canadian engineers are already fully employed and that there is a real dearth of first-rate professional men in the country. This will, I think, right itself in time.

Personally, I have every confidence in the present management of the Canadian Society of Civil Engineers, and I believe they are doing good work and aiming steadily at a higher standard of civil engineering in Canada.

Respectfully,

Wm. P. Anderson.[*]

Strong Central Organization Required

Editor Contract Record:

In that the Canadian Society of Civil Engineers, to attain its greatest usefulness, should have a strong central organization with adequate, and even imposing, headquarters, as befitting the importance of the Engineering profession, I fully agree with you.

The engineer is the most important material factor in the present day development of civilization. The material well-being of society depends on the measure of the engineer's activity, and for this reason he is entitled to put himself forward much more than he does, in Canada particularly.

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[*] Past-President Canadian Society of Civil Engineers; Chief Engineer Department of Marine and Fisheries, Ottawa.

The National Society should be authority on all general engineering questions affecting the country, and as such should be well known to both Dominion and Provincial Governments. To be so, and for many other reasons, a definite and strong, well-equipped, central organization is required.

Yours truly,
W. H. Breithaupt.*

Interests Too Diversified to be of Real Value

Editor Contract Record:

I have read with interest your editorial upon the Canadian Society of Engineers and also the letters written by different engineers and published in your issue of the 26th ult.

In a society of this nature, embracing all the branches of civil engineering, it is difficult to carry on the work so as to make it of primary importance to each branch. For this reason you will find that many of the members of the Canadian Society are also members of societies pertaining more strictly to their especial line of work. For instance, personally I am one of the vice-presidents of the American Society of Municipal Improvements, which is really the representative body in the United States—and to some extent in this country—of the municipal engineers, and I must admit that I take a greater interest in the work of that society than I do in the Canadian Society of Civil Enginers, for the reason that I have given. On account, also, of pressure of work it is difficult to attend more than one convention, and an engineer will naturally attend the convention of the society where the discussions will be altogether along his particular line in engineering.

I doubt very much if the Canadian Society has yet reached that stage where it can have sufficient numbers attend in the different sections, and while a discussion may be very interesting to some men it may be lost on others attending.

It is really very hard to offer a practical suggestion as to how the Society may be of greater benefit to the profession as there are many difficulties in almost any suggestion that is brought forward. The fact that the Society has no standing, for instance, like the Law or Medical Societies, places it in a position that is of little practical value in upholding the standard of engineering with governing bodies. The result is that all sorts and conditions of men creep into the profession. Probably the principal reason that the Society has such little influence with the different provincial governments, is that the engineer, as a rule, is no politician; in fact, I have no recollection of any engineer being a member of Parliament.

In conclusion I would say that I endorse the remarks made by Mr. Victor Brayley in his letter in your last issue.

Faithfully yours,
A. F. Macallum.†

Research Facilities

Editor Contract Record:

I have read with much interest your editorials of the 5th and 26th ultimo, and the communications of your correspondents re the Canadian Society of Civil Engineers. None of these, so far as I recall, has referred to the system in operation by some of the sister Societies, whereby their libraries are rendered of service to members not resident at headquarters.

A permanent staff of capable readers is employed and when a request from a member for a search of the literature on any special subject is received, a member of this staff is detailed to ransack the library. His report contains all the kernels and rejects all the shells, and is furnished to the enquirer at cost. If for some previous enquirer, the ground has already been covered, the information is supplied for the cost of transcription. It seems to me that if this service were made really efficient at Montreal, the Society would become of great assistance to many busy members to whom the excellent library at headquarters is now of little use.

May we not have been altogether too eager to establish local branches (where interest is too often depressingly apathetic) with the result that the parent Society has become financially hampered in its efforts to aid its members in substantial ways?

Sincerely yours,
Associate Member.

Legislate for the Engineer

Editor Contract Record:

Your leading articles concerning the status of the engineering profession, and also the columns opened for correspondence on this matter, are certainly opportune.

Those of us that are afar off occasionally make a pilgrimage to some distant city to attend a meeting of the Canadian Society. To many of us the direct usefulness of the Society ends there, until good fortune enable us to attend another meeting. This is felt so generally and applies to the position of so many members that it cannot be disputed. To remedy this, however, is a matter of administration that hardly affects the real standing of the profession as a body. Personally I am prepared to waive that point. The Society is growing fast, and we have so many branches that doubtless it is becoming very cumbersome to manage from one head, both in the details of government and general finance. As occasion arises, and the time is almost with us, there is no doubt that Provincial Associations will be formed, each taking care of itself, but each owing allegiance to the parent body, the Canadian Society.

What is more needed than talk of Society management, is real earnest talk and stern deliberation on the actual standing of engineers as professional men in this Dominion.

Why is it possible for any man—house-builder, plumber, engine attendant, or even office clerk—to pose as an engineer? Of what use or encouragement is it for younger men of the present day to place all their capital and the essence of their life into that soundest of investments—a university education, only to find, when they face the world, that they are in competition with the class I have mentioned. A workman, say a fairly skilled mechanic, but invariably one who has earned a living wage, at least from the age of fifteen or sixteen years, develops a taste for reading, secures some Government Reports, or connects up with a correspondence school, and then competes for a position which calls for an engineer, at what seems to the mechanic a liberal salary, but which is far under the salary the University graduate would expect, or could even afford to take, as a fair recompense for unpaid years of study.

This is not far-fetched or imaginative—it is true. Then once a position is held the mechanic tries to slide into the Society, and until lately has in some cases been successful. This is where I think things are wrong. To my mind, the most important question is how to remedy them.

I would suggest that steps be taken to secure legislative [illegible] from the Dominion Government, [illegible] along the lines of the Quebec Act, defining the position or title of "Civil Engineer," this including the different branches of the profession. This should definitely state that such a person must be accepted by the Canadian Society of Civil Engineers, and that no one be allowed to practise or perform the duties of an engineer unless he comply with the terms of the Act.

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* Wm. H. Breithaupt, M. Inst. C. E., consulting engineer, Toronto.

† City Engineer, Hamilton, Ont.

These, as occasion arises, raise the standard of admission to the Society, commensurately with the growth of the Dominion. This does not bar any particular class, for the standard is set to which even the humblest member of the profession must rise, but it does bar out petty, mean competition with which our younger members have to contend at present, and further, it would give beyond question a standard definition of each member of the profession. The present state of affairs does not hurt the senior members so very much, except in municipal matters. They have had their hard fighting and asserted themselves, and the Society is now their recreation, but in these days hundreds of fully fledged University graduates are being turned out each year. And competition is becoming keener.

The land surveyors have protection in every province, for their work involves legal process. The medical men have similar protection for the sake of humanity. Surely the engineering profession should have protection for both reasons.

I venture to say that such steps would develop an interest in the Society as nothing else would do.

Yours faithfully,

Frank Chappell

An Interesting Test of Reinforced Brickwork

Made for the Reinforced Brickwork Company, Limited, of Winnipeg, under the supervision of the Department of Buildings of the City of Calgary.

CONSTRUCTION

A hollow reinforced brick beam, consisting of two separate walls, 4 in. thick (bricks on edge) with a one and one-half inch air space between, making a total width of 9½ in., was supported on two 17 in. brick piers; the distance between piers (in the clear) was 10 ft. The south end of the beam was extended five feet beyond the outside of the south pier forming a cantilever of 5 ft. (in the clear) span. The height of the beam was 12 courses of brick (approximately 3

The piers were built directly on frozen ground, no special foundation being prepared.

MATERIALS USED IN THE CONSTRUCTION

Bricks.—Second-hand Cochrane common clay brick. Not thoroughly clean of old lime mortar.

Mortar.—Three parts Friedenburg local sand: one part Inland Cement (not tested).

Reinforcing.—Piers supporting beam were reinforced in every course with H.B. reinforcement. Every course of the beam, with the exception of the bottom course, was reinforced with the same material. There were no cross ties between the two 4 in. walls of the beams.

Reinforcement.—The reinforcement used throughout was "H.B." reinforcement, which is specially woven mesh fabric of high elastic limit steel. The fabric being treated with an asphaltic preparation to make the same impervious to the action of the atmosphere.

GENERAL INFORMATION

Temperature.—During the entire construction the temperature was below 32 degrees F., and the only precaution taken against this condition was to heat the water used in the mixing of the mortar.

Date of completion of construction, December 21, 1912.

Weather.—From the date of completion of construction to the date of the test, the temperature varied from 40 degrees above to 37 degrees below zero F. During this time several snow flurries occurred. Date of test, February 1, 1913.

Beam loaded 15,715 lbs.; cantilever loaded 5,407 lbs.

Supervision.—The test was constructed and carried out under the supervision of the Department of Buildings of the City of Calgary. The construction was completed under the immediate direction of W. W. Hay, B.Sc., of Calgary, and the tests made under the immediate direction of this department.

Time of Test.—The test was started at 1 p.m. February 1, 1913, at the Union Iron Works, East Calgary, and was completed at 5 p.m. on the same date.

Test.—The loading of the beam was started at one o'clock. Throughout the test the temperature remained below freezing. The loading of the beam and cantilever was carried on simultaneously in the ratio of two pounds on the beam to one pound on the cantilever until a load of 3,926 pounds had been placed on the cantilever. At this time very minute hair cracks could be observed on close inspection of the mortar joints. The loading was continued until it had reached 7,128 pounds on the cantilever. Under this load the hair cracks had increased but there was no sign of an immediate failure. When loading was again started, the load became overbalanced and fell backwards, the principal part of the load concentrating itself on the rear four inches of the cantilever, and this rear four inches failed as a cantilever. An examination of the failure showed that the reinforcing and bricks had sheared directly over the south edge of the pier in an almost perfect vertical line. The front four inches, while shattered, owing to the failure of the back portion and the consequent severe side thrust due to this failure, remained in position.

In the meantime the span had been gradually loaded until the weight of 12,715 pounds had been placed thereon. A very close inspection of the span under this load showed the starting of very minute

Beam and cantilever after loading test

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* Town Engineer, Oshawa, Ont.

hair cracks. The loading was then continued until a load of 16,016 pounds had been superimposed. Under this load the original hair cracks had been slightly enlarged, but would still be considered as hair cracks (1-64 in. wide) and another set of minute hair cracks were observed. On account of the short lengths of pig iron which were available it was not considered safe to continue this loading to a greater height.

The span was then rammed, a 2 x 12 timber being used, the rammer being manned by four men and after seventeen severe blows, during which the brick themselves were severely damaged although the beam as a whole still remained intact, the swaying of the wall finally caused the load to overbalance and the front four inches of the span was destroyed structurally, although still supporting itself in position. The rear four inches of the span, while considerably checked from the side thrust of the falling pig iron, still retained its form and would have stood a considerable re-load.

The whole of the remaining beam was then overturned with the result that while destroyed as a beam many portions were still intact.

Cracks.—The hair cracks on the cantilever started near the pier and followed the mortar joints diagonally towards the unsupported end of the span until within two courses of the top and then the direction reversed towards the support. The hair cracks on the span first showed toothing through the mortar and brick near the center of the span. Later hair cracks started on the south side of the span about 12 in. from the support and followed the mortar diagonally towards the top of the center of the beam but were discernible for only six courses.

Practical Hints on Sewer Construction

Useful Suggestions on Trenching, Jointing Pipe and Handling Cement Work in Cold Weather—Ground Water Difficulties

By W. W. Brigden[1]

MANY sewer contracts are let for two-thirds to three-fourths of the amount required to do the work in strict conformity to the specifications. The specifications, in most cases, are unnecessarily strict or defective for want of important practical provisions. The contractor who makes a proposal for sewers, especially in a city or district not previously excavated extensively, is entering into a gambling proposition unless the city or the contractor put down test pits. A contractor in Buffalo, N.Y., who built a main trunk sewer, took the work for a lump sum, as was required by law. Several test pits had been sunk along the line and it was reported there was no rock found. At the time the writer visited the sewer the contractor was running five or six steam drills and was blasting hard Niagara limestone at a cost of $1 per cubic yard more than was estimated on the basis of the results of the engineers' test pits.

Material for Sewers

The writer still prefers shale or fire clay vitrified pipe from Akron and other central Ohio points to cement pipe, although he is willing to concede that in many cases, especially where the pipe diameter is larger than 27 in., cement pipe may not only be cheaper but as good. The trouble with Portland cement sewer pipe is that there is such a great opportunity to defraud by decreasing the amount of cement and workmanship necessary to bring about the best results. The use of clay sewer pipe has had the test of so many years as to prove its worth, and if the sizes from 8 to 12 in. are of the best "standard" and from 15 to 27 in. the best "double strength" there is little chance of making improvement under present conditions. For sewers larger than 24 or 27 in. there is plenty of room for discussion as to whether concrete pipe made on the surface or monolithic (reinforced or plain) should be preferred in ordinary dry material. In wet material the preference should probably go to the pipe made on the surface, as the manipulation can be much more carefully carried out and only the joints remain to be made under difficulties.

Brick sewers were very common ten to twenty years ago, but in many places are not used at all of late. If the engineer finds it necessary to use bricks he should not accept the ordinary clay bricks used for buildings; these will absorb from 15 to 30 per cent. of their weight in moisture. The best bricks for sewers are the shale clay bricks from Ohio, Indiana or Illinois, which will not absorb more than from 1 to 5 per cent. The abrasion test and the absorption test go closely together, and one will nearly always indicate as well as the other what would be the outcome.

Equipment

A small house for cement, ropes, hose, etc., mounted on wheels is a very convenient and useful part of an outfit for a sewer gang and need not be at all expensive, the running gear being the main item of cost. Such a house or shanty will last for 15 or 20 years if slightly repaired each year or two.

Some kind of a trench machine is necessary on very wide or very deep sewer work. If the depth is over 15 ft. handling by men makes the cost prohibitive.

While many contractors still use wooden braces, they are greatly inferior to the iron screw braces such as are made by the Dunn Manufacturing Company of Useful Suggestions on Trenching, Jointing Pipe and Handling Cement Work in Cold Weather ..... Pittsburgh, Pa. Battle Creek has over 200 of these braces. Many of them have been in use for 15 years and some longer. There are other iron braces, some of them about as good as the ones mentioned, others not worth buying when good ones can easily be had.

Driving and Pulling Sheeting

If the work is to be done either by contract or by labor, and the line covers more than 2,000 ft., the contractor should have enough 2 x 10 in. by 14 ft. yellow pine plank to sheet a trench from 100 to 300 ft. long. The same material should be used for ledgers or rangers, and the best size for this work is 3 x 8 in. by 14 ft. This size is much to be preferred to 2 x 12 in. by 14 ft., and costs little, if any, more, as both contain the same number of feet of lumber. Some shorter planks 8 ft. long, should be purchased, as long plank is very inconvenient if used in shallow trenches or for the bottom row where the sewer is deep enough to require more than one but less than two full lengths.

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[1] Engineer and Superintendent Board of Public Works, Battle Creek, Mich.

To drive plank with an iron maul striking directly on the top is such a waste of lumber that it should not be tolerated in any well-regulated outfit. Malleable iron plank caps should be purchased, the top of the planks beveled to the shape of the plank caps and the driving done on these with a wooden maul. Plank should not be pulled with a chain and an ordinary wooden lever, but a lever with an iron claw at the outer end should be used and the plank gripped by a U-shaped plank puller attached to a chain, the chain being adjusted by setting a link in the claw. A wooden horse should be used on which to rest the lever. With the appliances mentioned good yellow pine plank can be made to last for three or four working seasons. To save the lumber from splitting iron staples with two short legs bent at right angles and cut to a point for driving into the plank are the best things with which the writer is familiar. Holes are sometimes bored with a bit and a long spike driven into the edge of the plank, but these are not equal to the staples made of a piece of ¾ x ⅛ in. iron about 6 in. long.

Cement Joints and Roots

One of the most important matters neglected is the making of cement joints in sewer pipe. As ordinarily done, the contractor's pipe layer merely places a little cement in the lower side of the bell, perhaps one or two trowelfuls for a 12 or 15 in. pipe, spreads it out without much care and places the spigot end of the next pipe in the bell of the one previously laid. The proper way is to excavate in front of and about 1 in. under the bell and put in as much as five or six trowelfuls of cement for a 15 in. pipe and for others in proportion. The cement should reach out in front of the bell about 3 inches, and there should be three small stones placed in the cement so that the spigot end of the pipe cannot settle by its own weight or when the first dirt is thrown into the trench. These stones should be chosen with some care, for if they are too large or too small they will not answer the purpose. The cement joint should then be carried up the sides a little above the center of the pipe, so that sand will not fall on the cement and get mixed with it when the tamping is done. The pipe should then be laid and the joint carried over the top of the pipe of the same size as that below, making it from 5 to 7 in. long and from ½ to ¾ in. thick over the outside of the bell, enclosing the whole bell and reaching over onto the spigot end of the pipe from 3 to 5 in. If the pipe is large enough the pipe layer should reach into the pipe and with his trowel smooth over the joint, except that at the top. It will be very difficult to do the upper third, as the cement mortar will fall off in spite of very careful work. Of course all superfluous cement inside the pipe should be removed in any event. In all small sewers a follower of rubber or a swab should be used.

A line should be set above a pipe sewer parallel to the grade line and on the center line of the sewer, the grade to be set with a pole, using a level to be sure that the grade pole is vertical. The line should be given by a plumb-bob and string, the plumb-bob to stand just in front of the bell, where the pipe layer can easily see when it intersects the center line of pipes. After the pipe is laid it should be thoroughly tamped under the lower side, preferably using an iron tamper with a curved handle bent approximately to the shape of the outside of the pipe. If one wishes to see how poor the tamping is done, require the pipe layer, without previous notice, to take up one or two pipes after he calls them fully laid, and almost invariably you will find the tamping has not reached near the bottom of the pipe at its center. The proper laying of pipe, as stated, is a matter of great importance, much more so than is generally understood, but in many cases no more attention is given to this part of the work than is given to the excavation, sheeting and other ordinary requirements.

Well-Made Joints Essential

To some it may seem a waste of money to use two to four times the usual amount of cement mortar to a joint of pipe sewer, but the writer believes that the money will be profitably employed. Unless the joints are well made roots will grow into the sewer and there will be serious trouble. It was this factor which led Battle Creek to adopt the joints described. Often the holes through which roots enter sewers are not over 1-32 in. in diameter. As indicating the extent to which roots may grow inside a sewer the H. L. Bond Company, of Boston, Mass., has sent to engineers a photo showing a root 84 ft. long which was removed from a sewer. This root was taken out by the use of sewer rods and tools made by that company.

In Washington, D.C., where there are more trees than in any place the writer ever visited, the engineers, in order to remedy the trouble from roots, encased pipe sewers in concrete. This is the only city of which the writer is aware where this practice has been carried out, and it will require much more evidence for him to adopt so expensive a method.

Another trouble with sewer-pipe joints is expansion and contraction. Most Portland cement of the present day contracts in the process of setting, but rarely enough to allow rootlets to enter. From a careful examination a contraction of 1-100 in. would probably allow them to enter. The writer has followed the very small rootlets with a microscope, such as is used for reading a transit vernier, and they ran into the cement where it was difficult to follow them. When natural cement was in common use the cement sometimes expanded, and there are frequent instances in our city where it expanded enough to let the rootlets in, and in some cases enough to break the bells and thus leave a large inlet for roots. This has not occurred with Portland cement and is believed to be partly due to using too rich a mixture. In some cases the plumbers, in laying house connections, used neat, or pure, natural cement or a mixture of one cement to one sand. These places were where most of the trouble occurred.

Ground Water Difficulties

Too much cannot be said against the very common practice, although forbidden in almost all specifications, of constructing sewers in quicksand, fine sand or mud where there is any free water. While the specifications forbid this practice, it is almost universally done in small cities. This is probably due to the great cost of obtaining the necessary pumps and pumping the water. Where the contractor or city has a large amount of work to do three types of pumps should be provided if water is to be properly handled. These consist of 2 in. and 4 in. galvanized sheet-metal hand or bilge pumps, a 1 to 2 h.p. gasoline operated centrifugal pump and a 4 in. gasoline or steam operated centrifugal pump with an engine having about

10 h.p. The writer has obtained excellent results by the use of one, or better two, siphons operated by water from a hydrant and attached to one ordinary fire hose line. The water, of course, must be discharged into the sewer behind the construction work just finished. The suction pipes should be from 2 to 3 ft. long and the discharge pipes about 20 ft. long. The jet diameter should vary, according to the water pressure, from ¼ to ½ in. Boxes must be used to feed the suction pipes to prevent large quantities of sand from entering the siphon. The use of these siphons enabled the amount of sewer laid per day to be increased four or five times that obtainable before. As the sewer was in fine sand, where the depth of the ground-water was from 5 to 7 ft. above the bottom of the trench, no rapid or good work could have been done without removing the water. It is self-evident that no proper sewer construction can take place where fine sand, quicksand or clay in the bottom of the trench is wet to a level above the invert, even though that may be but 2 or 3 in., and the difficulty is greatly increased as the water increases.

Concreting in Cold Weather

For work done in the fall or early winter the most convenient manner of warming water for cement mortar and concrete when not needed in large quantities is a cooker such as is used by farmers to heat feed for horses and cattle. Battle Creek has two of these and finds convenient use for them during the latter part of the working season. If the weather is unusually cold in the fall a cylinder made of an old boiler or some similar iron construction is very useful for heating sand and gravel. A hole can be made in the top of the cylinder and a piece of pipe, 6 to 10 ft. long, attached for draft. One end of the cylinder should be closed up and the other either left open or provided with some temporary sheet metal piece placed partly or wholly against the cylinder to keep out the cold air. Almost any kind of wood can be used for fuel, and the gravel shoveled against the sides of the cylinder is rapidly heated so the concrete or motar can be put into the work at a temperature considerably above the freezing point. To save wood and produce the best results temporary grates must be used inside the cylinder. This also prevents warping the cylinder by heat. It is sometimes necessary to put a brace in the center to keep a light metal cylinder, ¼ in. or less thick, from collapsing badly. The cylinder is quite easily moved from place to place, either by rolling it by hand or dragging it with a team, with or without skids. The writer has lately removed the light sheet jacket from the cooker and, after bending a ½ in. pipe into a coil and placing it within the shell, attached it at both ends to the pipe and hose used for heating fed water on its way to the continuous mixer used on the work. This mixer is one made in Jackson and is propelled by a gasoline engine. The combined heat obtained by passing the water through the coil as it is fed into the mixer, the gravel and sand heated by the boiler-iron cylinder and the heat of the cement seldom leaves any necessity for using salt to lower the freezing point, but if the temperature is very low salt may also be used.

By covering up a monolithic concrete sewer, as soon as the concrete is placed, with a skeleton of plank, laying some tarred felt paper on the plank and placing a few lanterns inside the sewer, the temperature may be maintained until the concrete has set. The time necessary to use lanterns depends on the weather, and may run from a few hours to a day or even two. The writer does not desire to encourage young engineers to enter into sewer construction in cold weather, as it is very expensive, at times adding from 10 to 20 per cent. to the cost of labor. One of the items of extra cost is breaking frost where the street surface is frozen from 2 to 12 in., sometimes even more. Where the depth of frost is as great as 1 to 1½ ft. it will often take a laborer a day to dig a hole 2 x 3 ft. to the depth of the frost. By the use of a cord or two of wood 30 to 100 ft. of moderate frost can be removed by building a fire at 10 or 11 o'clock at night, watching it for a time and then leaving it until the next morning. It will then be found easy to dig the ground. The main part of the thawing is done by the bed of coals lying several hours on the ground and communicating the heat from pebble to pebble or from grain to grain of sand. Clay and muck do not thaw out so easily and will require two or three times the fuel necessary in sand and gravel. A very good fuel for moderate thawing or for starting a fire is the material placed in cars of sewer pipe to keep the pipe from injuring one another. It should always be saved for this purpose, if possible. It is most excellent for use with the cooker and sand heater.

No less a sum than $400,000 was voted recently by Wellington county, Ont., for the construction of permanent roads. It was shown that the yearly cost for interest and a sinking fund was less than the amount now spent annually with practically no results. It is not proposed to raise this sum at one time but by installments—probably $100,000 at a time.

The frost line at Detroit during the winter of 1911-12 extended to a depth of over 5 feet in many places in paved streets. While few water mains suffered, more than 1000 service connections were frozen. Mr. George H. Fenkell, city civil engineer, reports that the Board of Water Commissioners has directed that all service connections be covered, hereafter, to a depth of [illegible] feet in paved streets and 5½ feet in unpaved streets.

The 3000-ton testing machine erected last year in the Royal Testing Station in Berlin is operated hydraulically, and is designed to receive struts and tension members 50 ft. long. In using this apparatus special attention is to be paid to flexure and collapse of columns and resistance of riveted joints. All heavy parts of the machine are of forged steel. According to the Zeitschrift des Vereines deutscher Ingenieure, two 200-atmosphere water pressure buffers are provided to absorb the shock when rupture takes place. The high-pressure pistons are packed with cup leathers.

A concrete fence of unusual design has recently been built for the Glen Ridge Tennis Courts at Glen Ridge, N.J. The fence posts are 3-in. I-beams, 12 ft. 6 in. long and spaced 12 ft. 1 in. on centres. The I-beams are anchored 2 ft. 6 in. in the ground and their flanges were wrapped with expanded metal lath to a height of 6 ft. above grade, in order to carry cement plaster. Two 2 x 3-in. spruce rails were placed between the posts, one at the ground line and one at a point 6 ft. above the ground. Between the rails and the posts rib truss reinforcing plates, made by the Berger Manufacturing Company, were placed, forming the reinforcement for the 3-in. concrete slab. Above the reinforced concrete portion of the fence wire netting was fastened between the I-beam posts, thus making a fence 10 ft. high. The cost of this fence is said to be about $1.80 per lineal foot.

Progress of Highway Improvement in the Province of Ontario

THE annual report of Mr. W. A. McLean, Provincial Engineer of Highways, has just been received. The report contains details of the expenditure made by the several counties—eighteen in all—operating under the Highway Improvement Act. The total expenditure under the Act in 1911 amounted to $712,072.52, of which the province paid $237,357.50. The total expenditure under the Act from 1902 to the close of 1911 amounts to $3,402,602. As usual the report contains a mine of information for all those identified with this field. Interesting features thereof are the sections devoted to road construction, road metal, highway bridges and culverts, with the accompanying illustrations. Mention should be made of the complete regulations of the Public Works Department with respect to county road systems. We reproduce below a number of interesting extracts from the report.

Scattered Improvements

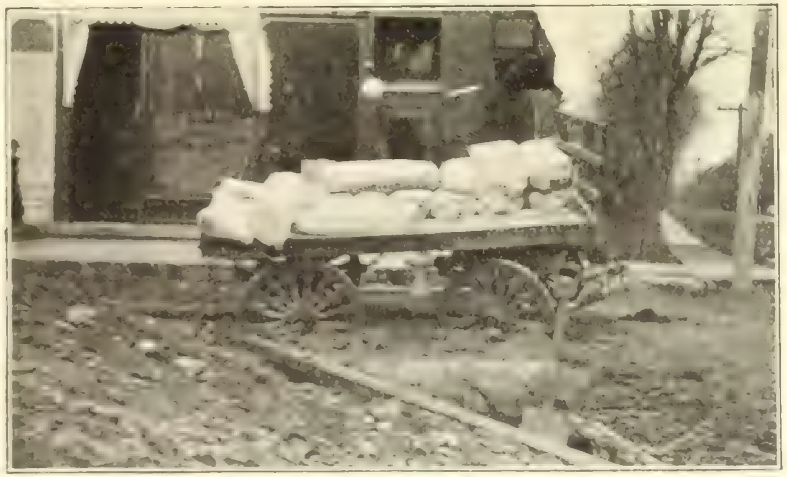
There is a tendency in some counties to distribute the county road work each year in short sections, rather than to take up one road and build it from end to end. Work is scattered in this way for various reasons. Each councillor is ambitious to have some work done in the township he represents; there may be a fear that certain ratepayers will become dissatisfied if all the work is done in another locality; that the total expenditure may become exhausted before all roads are reached; there may be a desire to let all sections in the county see the class of work done on the roads, and to receive some early benefit; a wish to construct a section of road that is especially bad, or is largely travelled. The tendency is greatest in counties where there are numerous market centres or shipping points, and less in the counties with one well defined centre, such as York with roads radiating from Toronto, Wentworth with Hamilton as a leading market, or Prince Edward with much traffic leading to Picton.

To build roads in short sections in some cases, may serve a useful purpose, but the practice is an expensive one and adds largely to the cost. Road building is almost entirely a work of labor, and it is essential to economy that a well arranged organization be created. It commonly takes a month to build a mile of road, and takes nearly that time to get the work going smoothly. To move the plant and equipment from place to place for every mile of road, means that the work will be kept in constant disorganization, that laborers and teamsters which have become accustomed to the location will leave, and new men will take their place, that much time will be lost in moving the machinery from place to place while wages are still going on. Every move made, means a loss of efficiency, loss of time, useless expenditure for wages, fewer miles built and a much increased cost. Short sections are justifiable and necessary in some cases, but to carry work on in that way as a fixed practice, involves a useless increase of cost. The necessarily increased cost of "model roads" is not an expenditure which counties should assume.

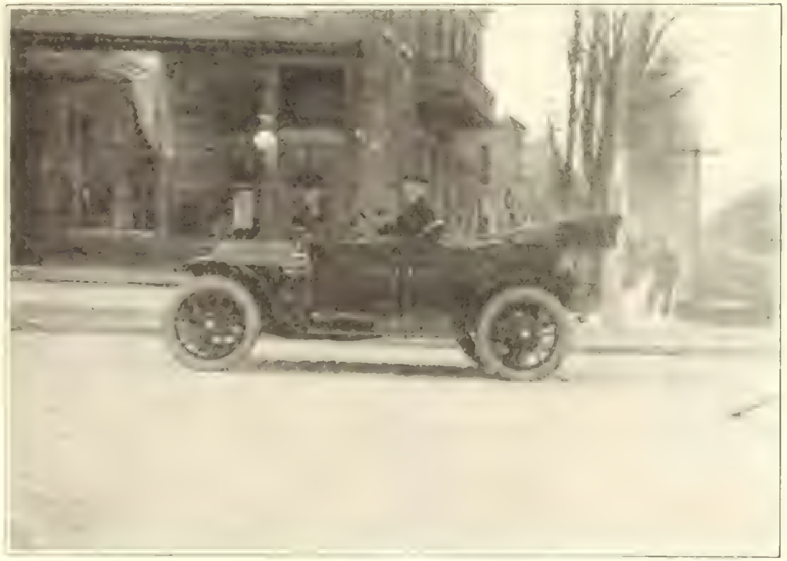
Government Aid

Government aid to road construction, as instanced by the Highway Improvement Act, has certain well defined advantages. It guarantees more efficient supervision and organization than municipalities have heretofore provided. It concentrates expenditure for a term of years on a well-defined plan of main roads. It provides a specific plan to be followed by succeeding councils, gradually creating a connected system of

Between Belleville and Trenton in Hastings County—Newly graded, gravelled and rolled.



Chestnut Street, Dunnville.
On the main business street in April, 1911.



Chestnut Street, Dunnville.
A photograph at the same corner, Nov. 1912, when paved with concrete.

A Road-Camp in Lanark County.
A road camp results in less loss of time due to unsettled weather and in going to and from work. The difficulty of boarding men and teams close to the work is overcome, so that men and teams can be hired over a wide area, instead of in the immediate locality of the work only.

"The Scotch Line," Lanark County.
The granite knoll to the right of the picture formerly extended across the road. The hill was cut away, the road straightened, and the quarried stone put through a crusher and returned to the road.

well built roads. A sufficiently large fund becomes available to permit substantial work. Through the Government grant, a certain portion of the cost is contributed by towns and cities.

There is a tendency, however, on the part of municipal councils and the public, to look for a largely increased Provincial grant. In support of such a proposal, the methods and laws of France, Germany and a number of the States are cited.

Large governmental expenditure has been successfully made and is necessary, but the sources of income should be considered. In the countries and states mentioned, the governmental revenues are derived wholly or largely by direct taxation. In Ontario, indirect taxation has been, to the present, the only source of Provincial revenue, while direct taxation is assigned to municipal corporations.

The indirect sources of income are restricted, and the Provincial revenues are thus fixed. Direct taxation, on the other hand, is flexible, and responsive to the ability of the people. With the responsive source of income, it appears advisable that municipalities should draw upon it, as far as their circumstances will permit; to be supplemented, rather than replaced, by Provincial expenditure. The primary object to be reached by Provincial expenditure is the creation of organization such as will equitably distribute the cost of main roads, so constructed and maintained as to adequately meet the needs of traffic.

Road Foremen

The number of foremen experienced in road construction is very limited in the Province, a condition which is creating temporary difficulty in obtaining the best results from road expenditure. This is especially the case for the first two or three years after a county has established a county road system, and for this reason it is seldom advisable to undertake a large expenditure for the first year.

Road building is an art, and as such requires trained laborers, and skilled supervisors of a class which only experience can create. One of the secrets of the good roads of England and France, is the large body of trained men who, through permanent employment on roads, have become proficient in their work. Practically all municipalities in Ontario, upon undertaking road construction on a comprehensive scale, must expect a certain amount of inferior work with greater cost until experience has created a body of skilled roadmakers.

A capable foreman is most important, and is essential to economical results. He should not only understand thoroughly all practical details of roadmaking, but must have a practical knowledge of machinery, with the ability to direct and control workmen. Roadbuilding is chiefly a matter of labor—men, teams and machinery—and foremen who can combine a knowledge of roads with capacity to direct such labor can only be obtained through the usual process of experience.

Machinery

The cost of road construction has been steadily increasing for some years with the advance of wages for men and teams. Road-building is almost entirely a matter of labor so that the increase has been very marked. Ten years ago, men were commonly employed in the townships for $1.25, and teams for $3.50 a day. The price now commonly paid is $2.00 a day for men and $5.00 for teams, while as high as $3.00 a day for men and $6.00 for teams has in some instances been necessary. With the advance in wages there has has been a decrease in labor efficiency, as with abundance of employment, men and teamsters have not had the former incentive to "hold their jobs."

The use of machinery to replace teams and manual labor, with greater efficiency of organization and supervision, comprise the only available remedy, and one which is satisfactory to the farmers of most townships as they need all available farm laborers. Stone could be quarried, and field stone collected in winter, teamed and piled ready for crushing, more frequently than is now done, thus giving employment during winter when men and teams have little to do, and would work for less wages.

The efficient use of machinery requires that it be kept steadily employed, otherwise the interest and depreciation charges over-balance profit. To this end the construction of main roads, as now centralized in county councils, is the most profitable method, while the more local method of patching and repairing roads never properly built, is increasingly deficient. To meet the situation, there is need of grading machines operated by traction engines; stone crushing outfits of ample capacity with storage and loading bins; wagon trains or trucks drawn by gasoline motors or steam tractors for hauling gravel and stone; equipment for unloading stone from cars where material is procured by rail; while a steam roller is always a necessity for efficient road-building such as will lessen future repair.

Traffic Conditions

Traffic conditions largely determine the kind and strength of road to be built. The regulation of certain traffic features, particularly those pertaining to the width of wagon tires, speed of motor cars, and maximum loads of steam and gasoline motor trucks, can be so applied as to materially lessen the cost of construction and maintenance.

Wider wagon tires, if generally adopted would reduce the wear of roads, and decreased the cost of maintenance. Narrow tires are an expensive luxury, as their grinding, pulverizing effect on limestone roads, and their rutting effect on gravel is very severe. This is particularly so, in the case of wagons which travel over a fixed route under all weather conditions. Such traffic in spring and fall, when the roads are wet and yielding, is most destructive. Heavily loaded milk wagons which travel to the factory or to the cities at all seasons of the year, heavily loaded wagons carrying the daily output of brickyards, quarries, sand and gravel pits, mills and factories, do a great deal of damage to the roads. Ordinary farm traffic in wet weather, conveyed on narrow tired wagons, does much injury that could readily be prevented by the general use of wide tires.

Narrow tires are preferred by teamsters for the reason that wide tires become heavily clogged with mud on clay roads, and because the narrow tires travel more freely in ruts, and do not strike so many stones. With wide tires, however, there would be much less tendency to create ruts and to loosen stones from the roadway. The chief objection to wide tires is that first mentioned—the tendency to hold mud between the spokes on soft clay roads under fall and spring conditions. There is, however, very little farm teaming on earth roads while the mud is excessively deep, and under other conditions the advantages of wide tires in preserving and compacting the roads would greatly

Machinery in Road Construction.
The cost of hauling gravel and stone, especially for distances over one mile, can be greatly reduced by the means indicated in this illustration—a traction engine and train of wagons as used in Wellington County.

A Wellington County road in Harriston.

The Kennedy Road in York County, near Toronto
Graded, drained, surfaced with broken stone and rolled.

The Kingston Road in York County, resurfaced with broken stone.

Gravel road in Elma Township, County of Perth

Formerly a winding road, was graded, straightened and surfaced with gravel and broken stone. The stumps in piles at the side were taken from the roadbed.

Road in Lennox and Addington County, Township of Camden

On a Prince Edward County road. Placing crushed stone and rolling.

The Plains Road in Nelson Township, County of Halton.
Graded, surfaced with broken stone, and rolled.

Concrete arch at Fergus, County of Wellington.
The rock formation is especially adapted to this type of construction.

outweigh their own disadvantages or the convenience of narrow tires.

Motor traffic has advanced very rapidly, and it is difficult to foresee the extent to which it may ultimately grow. That it is destined to a vast increase can scarcely be doubted. The automobile represents horse, harness and vehicle in one, and with a steadily lessening price, its future usefulness in improving the social conditions of farm life appear very great.

The growth of motor traffic is effecting an important change in road construction and adds a new meaning to the axiom, that a road must be built to meet the traffic conditions to which it will be subjected. Automobile tires, as compared with wagon tires, are soft and yielding, and in the early days of motor cars it was supposed that their wearing action would be slight. Such, however, is not the case.

The propelling power of a horse-drawn vehicle is communicated to the road through the feet of the horses. Speed is limited and makes little difference. The abrading effect of the steel tires comes solely from a downward pressure varying with the weight of the load and width of tire. Self-propelled vehicles, on the other hand, communicate their driving force to the road at the rim of the wheel. While the downward pressure due to weight of load does little injury, the driving force is very great. It is nearly horizontal, tending to tear away the surface of the road, throwing out the binding material and loosening stones. This shearing force increases with the speed—not in direct proportion; but in proportion to the square of the speed. Thus, taking ten miles as a unit of speed, and comparing with speeds of twenty, thirty and forty miles, the shearing force is not merely twice as great as twenty, three times at thirty and four times at forty; but instead, is four times as great as twenty as at ten miles, nine times as great at thirty, and sixteen times as great at forty miles. At fifty miles an hour, the shearing force is twenty-five times as great as at ten miles.

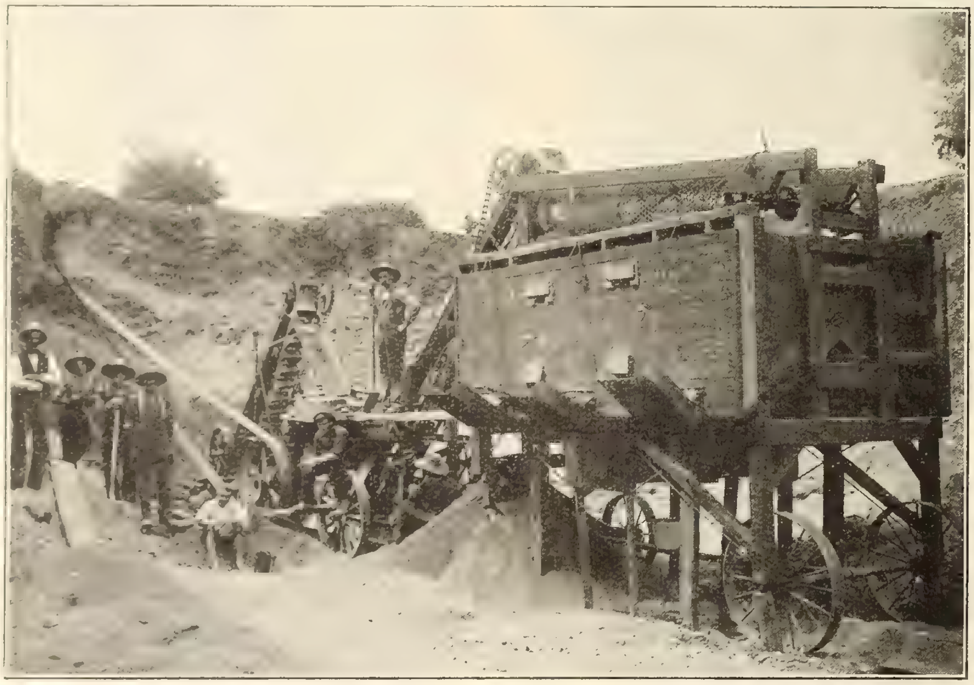
Excessive speed is thus exceedingly destructive to improved roads. The existing speed law of the Province permitting fifteen miles in cities, and twenty miles an hour on country roads, is very satisfactory from the standpoint of road maintenance. Motor cars of moderate weight travelling at a speed of twenty miles an hour, do comparatively little injury to a well-built road. Heavy cars travelling at a rate of forty or fifty miles an hour do excessive injury which cannot be provided for on ordinary country roads, at reasonable cost, by any form of road construction as yet available.

A study of the more serious motor accidents which have occurred from time to time, indicates that, in the majority of cases, they have been due to excessive speed or to careless or inexperienced driving, and were, therefore, preventable. The unavoidable accidents have been due principally to a suddenly defective steering gear, or to a pedestrian or child unexpectedly stepping in front of the car. Of all these causes, excessive speed has been much the most frequent.

At twenty miles an hour on country roads, a motor-car is under reasonable control, can be stopped quickly and turned to avoid an obstruction. Injury to the road, as stated, is within minimum limits. Forty or fifty miles an hour, however, possesses none of these merits, such speeds are recklessly dangerous to the occupants of the car and to other travellers, are destructive to the roads, and accentuate the dust nuisance.

Motor and steam trucks are coming into use on the country highways. A motor truck, itself weighing

Road in McGillivray Township, County of Middlesex



Gravel treatment in Middlesex County
The pit gravel is screened to remove excess of sand and earthy material, coarse stone is crushed, and the several sizes are deposited in the bin to be loaded into wagons. The traction engine operating the plant does not show in the picture. A loader into which the gravel is shovelled, feeds to the crusher.

Hanlon's Bridge, County of Leeds and Grenville
A steel warren truss with concrete floor.

six tons, can carry an equal load, making twelve tons in all. Two-thirds or eight tons is on the rear axle, one-half of that load is on each rear wheel, placing a load of four tons on each wheel. The disruptive effect of this load on road foundations is very great—particularly in wet weather.

Steam trucks, with steel tires, in some cases corrugated, are now in occasional use. As an instance, a five ton steam wagon in running order with fuel and water, weighs about six tons, ten cwt., with about two tons, fifteen cwt. on the front axle and three tons, fifteen cwt. on the back axle. Practically all the load would come on the back wheels so that, when loaded with five tons, the actual weight on the back axles would be eight tons, fifteen cwt.—or over four tons seven cwt. on each rear wheel. Trucks carrying fifteen tons and weighing in all about thirty tons are now being manufactured.

Self-propelled gasoline motor and steam trucks, in addition to their heavy concentrated load, have the further disadvantage of exerting a strong driving force referred to in discussing motor car speed, so that their use demands not only a heavy and expensive foundation, but an especially durable surface as well. Legislation limiting extraordinary traffic of this description would appear justifiable, in order that a large increase in the cost of roads may not be necessary to serve the requirements of a few vehicles. Such limitation at the present time would forestall the introduction of unnecessarily heavy vehicles, and would avoid individual hardship. Width of tire alone will not solve the difficulty, as, owing to the necessary camber of the road surface, excessive width places the load on the edge of the tire. Restriction of load permissible on one wheel would appear practicable, and if placed at four tons would at least forestall further increase in Ontario. Should investigation justify it, a less weight would be most desirable in the interest of road maintenance.

Road Classification

The roads of Ontario may, for a consideration of construction, be broadly divided into three classes; one grade merging into another, however, at the arbitrary dividing line. It is estimated that in the organized counties of Old Ontario there are 50,000 miles of road, and a classification would be approximately as follows:

	%		miles
1. Trunk roads connecting the large towns and cities	5	or	2,500
2. County or leading market roads .	12	or	6,000
3. (a) Main township roads	50	or	25,000
(b) Secondary township roads ..	33	or	16,500
Total	100	or	50,000

In the foregoing classification, the roads described as "Trunk Roads" are, with the exception of a few connecting links, among the most important of the county roads, and are heavily travelled for local market purposes, but they carry as well an increasing amount of through inter-urban traffic. The heavy and complex nature of this traffic requires, as a rule, construction of the most durable type varying from a concrete, brick, or other durable pavement to first-class macadam. The classes one and two, including trunk roads and leading market roads, thus include two divisions of what would be the main county roads of the Province. These comprise 17 per cent. or 8,500 miles in all, which if properly selected and constructed should carry 80 per cent. of the traffic of the Province.

The main township roads comprise principally the concession roads on which numerous farms front and which converge into and create the traffic of trunk or county roads. The more important of these should be metalled with gravel or broken stone, if available. Secondary township roads include the little travelled connecting roads which should be graded and given such further treatment as circumstances may permit. The first need for the roads classified as township roads is thorough grading, draining and bridging, and systematic maintenance with the log drag.

Gradients adopted, amount of camber or crown, width and depth of metal, foundation if any, drainage, binding material, and other details, should, as suggested, be largely dictated by the degree of traffic. A good road attracts and creates traffic so that the construction of any one road is very likely to raise it from one class to a higher grade, a matter which should not be lost sight of in planning improvement. Methods of construction should be as simple and direct as proper results will permit. There should, for true economy, be a well adjusted average between maximum service and minimum cost.

Cost Data on Street Paving

THE value of reliable cost data on construction work, as a guide in making estimates and increasing efficiency of methods, is at present fully realized by progressive engineers and contractors. Of late attention has been paid to the task of obtaining such data on street paving, and certain of the experiences met with on this class of work in Illinois were presented by Mr. W. W. Kerch in a paper before the Illinois Society of Engineers and Surveyors. Mr. Kerch calls attention to two recently completed contracts on which cost data were obtained.

The first contract was for a wood block pavement on a 5-in. concrete base, a 1-in. sand cushion and a coal tar pitch filler. In the center of the highway between property lines is a strip 22 ft. wide occupied by street car tracks. On each side of the strip is a straight curb, 2 ft. high, 6 in. wide with a 3-in. batter. On the property side of the roadway is a 2 ft. gutter, 6 in. thick and an 8 in. curb. Below the gutter and curb is a 6 in. cinder fill. The concrete used for the curbs and gutter was a mixture of 1 part cement to 3½ parts binder gravel, while that used in the street base was a 1:3:6 mixture. The roadway on either side of the street car tracks is 18 ft. between curbs.

The second contract was for a brick pavement on a 6 in. concrete base with a 2 in. sand cushion and a cement grout filler. The roadway is 36 ft. wide between curb lines. The curbing was a 5 in. sandstone on a 2 in. concrete base, the stone being backed up, within 6 in. of the top, with 6 in. of concrete. A 1:3:5 mixture was used on this work.

Labor and Material Costs

The wages paid on these two improvements were 20 cents per hour for common labor, 40 cents per hour for mixer men, 45 cents per hour for concrete blockmen, 60 cents per hour for finishers and form setters, 40 cents per hour for brick and block setters and 50 cents per hour for drivers without wagons. A careful record was kept of the amount of each item and the charges against it. The work was carried on under rigid inspection.

Pitch and Grout Filler

The information thus obtained gives a means of arriving at the comparative cost of pitch filler for wood blocks and a cement grout filler for brick streets. In the first contract the pitch filler material, costing $1,675.02, was distributed over 27,300 sq. yd. or at a cost of 6.1 cents per square yard. The material required for this cement grout, in the second contract, included 114 barrels of cement at 90 cents per barrel and 60 cu. yd. of sand at $1 per cubic yard. This amounted to 4.7 cents per square yard for the cement grout. The labor cost for the pitch filler was 1.4 cents per square yard and for the cement grout was 1.6 cents per square yard.

The hauling charge on wood blocks amounted to 3.2 cents per square yard against 6 cents per square yard for brick. The brick averaged 25 sq. yd. of pavement per thousand. In connection with the hauling charge it should be noted that other features than the distance from the railroad facilities entered into these items. The two contracts were at about equal distances from the base of supplies, but on the first contract the cost of hauling sand was 28.2 cents per cubic yard while on the second contract the charge was only 18.6 cents. This was due entirely to the layout of the streets adjacent to the work. In one case the carts could reach the work by a short route, while in the other a much longer haul was required.

Overhead and Bond Charges

On every piece of work there are always a number of charges that cannot be placed against any one operation or against any one contract. Among these are equipment, repairs, team expenses, rent, office expenses and miscellaneous freight. There are also such items as legal expense, surety bond, superintendence, traveling expense, watchmen and equipment rental. On the first contract these overhead charges amounted to 14.1 cents per square yard of paving laid; on the second contract the cost was 13 cents per square yard. The cost assessed against the first contract for bond charges was 16 cents per square yard of paving laid and that against the second contract amounted to 11.5 cents per square yard.

Ritz-Carlton Hotel, Montreal

The Ritz-Carlton Hotel, Montreal

THE Ritz-Carlton, recently opened, is undoubtedly the finest hotel in Montreal. Situated at the corner of Sherbrooke and Drummond streets, it is on a site which commands some of the best views of the city. The external appearance is in keeping with the magnificent interior decorations and the general furnishing. There are eleven storeys, the exterior consisting of limestone and terra cotta, the latter supplied by the Federal Terra Cotta Company, New York. The terra cotta trimmings at the windows are nicely blended with the limestone, while the cornice and three top storeys are examples of the fine effects which can be produced by the artistic use of terra cotta.

The architectural terra cotta on this hotel is a noteworthy example of the combined use of stone and terra cotta. The architects, with a ready appreciation of the pliancy of clay and its adaptation to modelling, have introduced terra cotta in all the ornamental features throughout the exteriors. Terra cotta has been introduced in the window trim on the lower storeys, and appears again immediately above in the second and third storey cornices, which are heavily enriched with modelling. Throughout the main shaft on all six elevations, terra cotta is intermingled with stone, and the exact match in shade is noteworthy. Again, terra cotta is the main building material used in the upper storeys of the building, and in the main cornice and frieze a second color has been introduced. This is a blue gray tone, and, in contrast with the limestone gray color, throws the modelled detail into high relief.

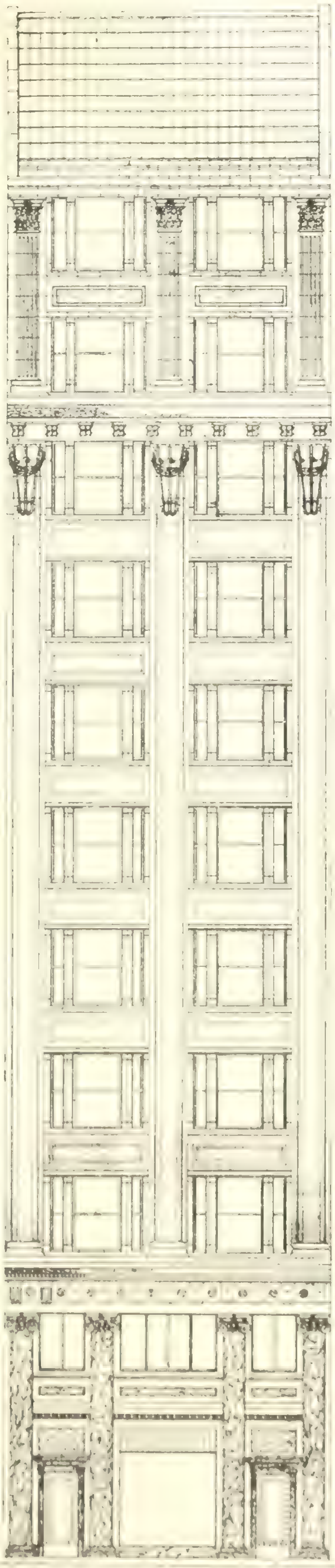
Unlike most hotels, there is no rotunda, its place being taken by a palm court, the register office, news stand, and telephone booth being hidden away in a corner. The palm court leads into an oval dining room, with accommodation for 250 guests. The decorations are in the Adams style. It has a slightly domed ceiling ornamented with classic reliefs, and is lighted from above by the reflected rays of lamps concealed in the cornice. Another feature is the ball room, 90 x 40 ft., which can also be used for concerts, banquets, and receptions. A balcony extends around the room, which can be reached through the foyer of the ball room by a separate entrance from Sherbrooke street. The foyer enables communication to be made between the ballroom and the main lobby, the walls of the foyer being of imitation Caen Stone. The ground plan of the hotel is in the form of a capital "L," of which the longer side lies on Sherbrooke street and contains the ballroom, while the shorter is on Drummond street and contains the restaurant. The palm court and entrance hall are at the juncture of the two wings.

Provision is made on the first floor for the employees, and all the floors above are guests' bedrooms. There are 27 suites, 164 double bedrooms, and 17 single rooms. The vice-regal suite contains seven rooms, including dining and reception rooms. Every bedroom has its bathroom and built-in wardrobe, together with portable electric light standards.

Naturally the kitchen is equipped with the most modern appliances, while the refrigeration plant consists of two 25-ton machines. The boiler room contains three boilers of 750 horse power, the same room having accommodation for coal bunkers, vacuum cleaners, pumps, suction tank operated by air compressors, and hot water tanks. The four fresh air fans of the multi-vane type are in the sub-basement. The architects were Messrs. Warren & Wetmore, and the general contractors the George A. Fuller Company, Montreal.

Proposed Brandeis Building, Montreal

PLANS are being prepared for the Brandeis Building, a ten-storey structure to be erected at 4 Phillips Place and running through the block 124 feet to another frontage on Union avenue. The width of the lot and building is 29 feet. The ground floor will have a public corridor and a store with a mezzanine gallery, and the remaining storeys will be occupied as offices. The front portion of the basement will contain safety deposit vaults, and the centre and rear parts boilers, machinery, etc. All outside walls are to be furred with two inch fireproof blocks and all partitions will be built of four inch fireproof blocks except around the elevators and staircases, where six inch terra cotta tile will be used. The staircases are to be of steel with either marble or slate treads, while the flooring and partitions are to be of fireproof construction. The foundations, side walls and retaining walls are to be built of concrete laid on hard pan. All the front and rear walls will be 12 inches thick, above grade. The ground floor is to be of marble and stone at the front, with terra cotta at the rear. Tapestry brick is to be used as face brick on both front and rear from the first to the seventh floor inclusive, and above this terra cotta will be used at both the front and rear. The side walls are to be built of ordinary Laprairie bricks 12 inches thick up to the first floor, and from there to the roof the brick will be 8 inches thick. The frame will be steel throughout, all the walls and floors to be carried on this frame. The building is to have hardwood finished floors except in the public corridor, lavatories and safe deposit, while all the interior trim, doors, etc., will be of hardwood. The ceilings are to be hung on metal lath. The roof is to be of reinforced concrete treated with patented waterproof ingredients. Windows opening out to adjoining properties will be fitted with wired glass, the frames to be of steel. Two Otis-Fenson elevators will be installed. Fire extinguishers and fire alarm boxes will be placed in the public corridors. Mr. H. Dunlap Morrison, N.J.S.L.A., is responsible for the architectural and structural designing, and Mr. Chas. Brandeis, civil and electrical engineer, has designed the heating, sanitary, electric and mechanical portion of the building.



Front elevation, proposed Brandeis Building, Montreal

Vancouver held first place in Canada for January building permits, the figures being $1,950,000.

Reciprocal Demurrage Discussed at the Montreal Builders' Exchange

THE question of reciprocal demurrage was discussed at the monthly luncheon of the Montreal Builders' Exchange held on March 6th, by Mr. J. E. Walsh, transportation manager of the Canadian Manufacturers' Association, Toronto. Mr. Walsh stated that this subject was by no means a new one and that it was in force in thirty states on the other side of the border. The most recent state to adopt it was Washington, and reports were to the effect that so far it was working out satisfactorily. In some other States, however, owing to certain conditions, it had been practically abandoned, the machinery for its working being very elaborate. The subject had been a live one with the Canadian Manufacturers' Association since 1906. He was of opinion that there were few receivers of freight who desired to use cars as warehouses, and there should be reasonable authority given to the railway company. He believed that the Canadian car service rules approved by the Railway Commissioners were reasonable. In 1906 the railway commission stated that they were willing to further discuss reciprocal demurrage but nothing had been done so far. There had however, been so many delays and losses that the Canadian Manufacturers' Association had decided to ask the Railway Commissioners to take up this question, and to impose penalties for delays. They desired uniform penalties similar to those which were granted to the railway companies and which were imposed on consignees. The late government had made an amendment giving the Railway Commissioners power to fix penalties for delay. The manufacturers were of opinion that it was time to get some relief from the unsatisfactory conditions which prevailed, and on the 15th of April they proposed to make representations to that effect before the Railway Commissioners. The Manufacturers' Association had drawn up a resolution which they will submit to the Commission, and some manufacturers were of opinion that they had not gone far enough in the relief they were asking. They had no feeling of retaliation, what they wanted was a service for which they were willing to pay a reasonable rate, and at the same time they were entitled to get that service for which they paid, and it was duty of the railway companies to see that the manufacturers obtained this.

Mr. Walsh spoke at length on the average demurrage plan now in force in the United States. This, among other things, provides that forty-eight hours free time is allowed for unloading or loading on all commodities. After the expiration of the free time allowed a charge of $1.00 per day or fraction of a day is made until the car is released. When, by reason of delay or irregularity of the carrier in filling orders, cars are bunched and placed for loading in accumulated numbers in excess of daily orders the shipper shall be allowed such free time for loading as he would have been entitled to had the cars been placed for loading as ordered. When, as the result of the neglect of any carrier, cars designed for one consignee at one point are bunched at originating point in transit or at destination, and delivered by the carrier line in accumulated numbers in excess of daily shipments, the consignee shall be allowed such free time as he would have been entitled to had the cars been delivered in accordance with the daily rate of shipment. When a shipper or receiver enters into an agreement the charge for detention to cars on all cars held for loading or unloading by such shipper or receiver shall be computed on the basis of the average time of detention to all such cars released during each calendar month, such average detention to be computed as follows:—A credit of one day will be allowed for each car released within the first 24 hours of free time. A debit of one day will be charged for each 24 hours or fraction thereof that a car is detained beyond the first 48 hours of free time. In no case shall more than one day's credit be allowed on any one car, and in no case shall more than five days credit be applied in cancellation of debits accruing on any one car, making a maximum of seven days that any car may be held free; this to include Sundays and holidays. At the end of the calendar month the total number of days credited will be deducted from the total number of days debited, and $1 per day charged for the remainder. If the credits equal or exceed the debits, no charge will be made for the detention of the cars, and no payment will be made to shippers or receivers on account of such excess of credits, nor shall the credits in excess of the debits of any one month be considered in computing the average detention for another month. A shipper or receiver who elects to take advantage of this average agreement shall not be entitled to cancellation or refund of demurrage charges under other sections.

Mr. Walsh went on to say that this agreement was optional and they were asking the Railway Commission that this should be adopted as an extension of their present rules.

Mr. Pauze, the chairman, commented on the good work that the Canadian Manufacturers' Association were doing in respect of the demurrage question, and the Builders' Exchange would do all they could to help in this matter.

In reply to questions as to loss incurred by reason of undue delays on the part of the railway company Mr. Walsh said he was of opinion it was not advisable to press for compensation for delays between terminals, but said that there was room for improvement in the matter of delays within terminals. At the same time he did not see how penalties for delays in transit could be worked out. No doubt one could recover for goods being detained unreasonably. Some bodies were holding out for a clause to the effect that goods should travel at the rate of 100 miles per day.

Canadian Railroad Development.

Mr. J. G. Sullivan, chief engineer of western lines of the Canadian Pacific Railway, announced recently that tenders were being called, to close April 15th, for a tunnel 28,000 feet long to cut through the Roger's Pass Hill.

Completed figures for the year ended December 31st, 1912, show that during that period 969.90 miles of new track were laid by the Grand Trunk Pacific and National Transcontinental Railways combined. This shows an increase of 435.65 miles over 1911.

It is stated that the Canadian Pacific Railway will push through the construction of the Lethbridge-Weyburn line during the coming summer. It is expected that the steel will be laid from both ends to such an extent as to leave a little over fifty miles to complete by the fall.

An additional million dollars has been appropriated for the new C. P. R. hotel at Vancouver. The first appropriation was one million and a-half, but it has been decided to make further alterations in the plans, and it is proposed to have a central tower of sixteen storeys with a roof garden on the top.

It is stated that the appropriation for the improvements to the Canadian Pacific Railway hotel at Vancouver has been increased by a million dollars. The first appropriation was one million and a half, but it has been decided to make further alterations in the plans. It is proposed to have a central tower of sixteen storeys, with a roof garden.

The Canadian Northern Railway Company has filed with the City Solicitor of Toronto plans for its new estern entrance to the city. The company desires to run down the east side of the Don, paralleling the civic industrial line, in order to get access to its new freight yards on Eastern avenue. The plans call for the construction of another bridge across the Don south of Queen street.

A despatch from the West states that the Grand Trunk Pacific has decided to divert its Moose Jaw branch into Swift Current, Sask., and that, although construction from Watrous will go right ahead, the steel should be laid into Swift Current at least twelve months earlier than the other lines, after which it will be possible to work both ways. The despatch, in fact, anticipates that the Grand Trunk Pacific will be in Swift Current by the end of the year.

A despatch from Brandon, Man., states that all arrangements have now been made with the contractors for the Grand Trunk Pacific bridge across the Assiniboine River near that city and that instructions have been issued to recommence operations and to rush the work to completion in as quick a time as possible. It is this bridge which has been delaying the entry of the Grand Trunk Pacific Railway into Brandon.

The contract for the completion of the standard guage line on the Kaslo and Slocan Railway between Kaslo and Whitewater has been let by the Canadian Pacific Railway to Mr. W. P. Tierney, the Vancouver contractor. Mr. Tierney states that the work will be commenced at once and when completed will give through communication between the Kaslo and the Slocan districts with rail connection via Nakusp to the coast.

The Canadian Pacific Railway's plans include the expenditure of $175,000 for track extension in its Moose Jaw yards. This amount is in addition to the proposed appropriation for new shops, which are expected to cost from $200,000 to $250,000, and a new depot estimated at $300,000 or $400,000. The additional trackage in the local yards will probably amount to about twelve miles of steel, increasing the capacity of the yards by over 25 per cent. The new depot will provide for all the local offices of the company.

Replying to the Quebec Board of Trade, on the question of grades on the Transcontinental Railway, the Hon. F. Cochrane, Minister of Railways and Canals, stated that: "At two points on the line, viz.:—near miles 395 and 397, west from Quebec, virtual grades eastbound of 4-1 per cent., and westbound 6-10 per cent., have for economy of construction and operation, been adopted for the present. These are what is known as velocity grades, and do not injuriously effect the economical operation of the road."

It has been announced that there is every expectation of the Canadian Northern Railway linking up Port Arthur with Sudbury by rail in the fall. This will give the company a line of their own from Quebec to the Yellow Head Pass. A gap of but seven miles of track has to be filled between Ottawa and Smiths Falls. The company have now in Eastern Canada steel extending from about one hundred miles west of Sudbury to Quebec. For almost three hundred miles of the distance between Port Arthur and Sudbury the track is laid and ready for operation.

A total of 955 miles of railroad was constructed in the province of Alberta during 1912 by the various companies, according to a statement issued by the Ministers of Railways and Telephones. The total was made up as follows: Canadian Northern, 583; Grand Trunk Pacific, 254; Canadian Pacific, 93; Edmonton, Dunvegan and British Columbia, 25. In addition to the above, 518 miles of grade were ready for the steel at the end of the year. The total railway mileage of the province up to the end of last year was 3,055, of which the three principal companies owned the following: Canadian Pacific, 1,480; Canadian Northern, 912; Grand Trunk, 538.

An attempt is being made to stop the construction of the Mount Royal tunnel of the C. N. R. Mr. H. B. Rainville, who owns a residence at the corner of Sherbrooke and McGill College Avenue, has brought an action for an injunction against the C. N. R. from crossing his land. He contends that he is the owner of the land to the centre of the earth, and that if the company want to build a tunnel they must expropriate the property. The company are willing to pay $1,000 for the right to build beneath the surface, and to assume all responsibility for damage. The decision to be given is very important, as if it goes against the company, there are many hundreds of houses which will have to be bought. Mr. Rainville's action is in the nature of a test.

From Moose Jaw comes the statement that during 1913, the Canadian Pacific Railway will spend approximately one million dollars there. Already $175,000 has been voted for new tracks in the yards, and there are being considered details of plans for the new shops which will cost approximately $200,000. The new trackage in the yards will total over twelve miles. There is a new depot to be erected at a cost of $325,000. This will house the telegraph office, freight offices, the Dominion Express, and the other offices of the company. The depot will be on the site of the present structure and its main entrance will face the principal street of the city. On the Outlook branch, forty miles of 56-pound steel will be replaced by 85-pound rails. Provision is also made for the erection of some twenty new stations in this district.

Erratum—An erroneous item regarding the construction of the line from Harte to Brandon, for which Messrs. Hyland, Plummer & Galloway have the contract, was published on page 62 of our issue of February 26. The contract for this work was let some eighteen months ago and over one-half of the grading is now completed. The above firm, which has the contract for grading, as well as for the trestle bridges, has no connection with the Hyland Navigation & Trading Company, the firm which was erroneously connected with this contract in our previous report.

Hydro-Electric Development on the Chattahoochee River

The accompanying illustration is a reproduction from a photograph of the completed hydro-electric development on the Chattahooche river, about fifteen miles above the city of Columbus, Georgia. This dam is 63 feet in height and the work involved 140,000 cubic yards of masonry. The horse power developed is 40,000. The value of the equipment used by the contractors, the Hardaway Contracting Company, was $240,000. Carbonizing Coating Paint, manufactured by the Goheen Manufacturing Company, Canton, Ohio, was used exclusively on the equipment.

Completed hydro-electric development on the Chattahoochee River

Personal Mention

Mr. [illegible] has been appointed Assistant City Engineer of London, Ont.

Mr. [illegible], a former city engineer of London, Ont., died in that city on February 28th.

Mr. William Dunkley, of the firm of Dunkley Bros., contractors, Toronto, died in that city on March 4th.

Mr. W. H. Beman, of Montreal, is the new commissioner in charge of street paving for the city of Sherbrooke, Que.

Mr. L. I. Stone has been appointed Assistant Engineer of the Grand Trunk Railway, with headquarters at London,

Mr. Alan Fraser, B.A.Sc., of the C.N.R. engineering staff, has been appointed engineer to the Toronto Iron Works, Toronto.

Mr. Percival Lancaster, construction engineer of the Canadian Pacific Railway, has been appointed city engineer of Belleville, Ont.

Mr. W. A. Siegner has been appointed Assistant Engineer of the Grand Trunk Railway, with headquarters at Stratford, Ont.

Mr. Hugh Gall, B.A.Sc., has been appointed assistant engineer to Mr. Frank Barber, consulting engineer and Engineer to the County of York.

Mr. James Hutcheon, the former city engineer of Guelph, Ont., has accepted a position in the Department of Lands, Forests and Mines at Toronto.

Mr. H. A. Palmer has been appointed Assistant Engineer of the terminal division of the Grand Trunk Railway, with headquarters at Toronto.

Mr. James Irvine, resident engineer of the Canadian Pacific Railway at Kingston, has been removed to Toronto. L. S. Rudder, of Toronto, will take his place.

Mr. Francis H. Parr, of the Institution of Municipal and County Engineers, and the Royal Sanitary Institute, has been appointed engineer to the municipality of Kildonan, Man.

Mr. C. H. Cunningham is now identified with the Thor Iron Works of Toronto, of which company he is a director. Mr. Cunningham has been associated with Mr. Frank Barber. of Toronto, for the past two years.

Sir John Jackson, M.P., is on a visit to Montreal. Sir John is one of the largest British contractors, and has completed some of the finest engineering works in the world, especially in the railway and harbour departments.

Mr. George Yale, Mechanical Engineer of the Montreal Que., Harbor Commissioners, died at his home in Montreal, February 8th, at the age of 60 years. He had been with the Harbor Commissioners for the past six years.

Sir William H. White, formerly chief constructor of the British navy, died recently at London Eng., as the result of of a stroke of apoplexy. He was responsible for the designs of all the war vessels launched in Great Britain between 1885 and 1900.

Mr. Wm. G. Merowitz has severed his connection with the Holtzer-Cabot Electric Company, of Boston, Mass., and is now engaged as a power apparatus sales specialist in the supply sales department of the Northern Electric & Manufacturing Company, Montreal.

Mr. R. H. Merriman, who has been connected with The B. Greening Wire Company, Limited, for a great many years, and who, since the firm's incorporation, has been Secretary and a Director, has resigned in so far as active connection with the firm is concerned. Mr. Merriman is one of the best known men in the hardware trade and carries with him the best wishes of all who knew him. We understand that Mr. Merriman is going into the agency business, but that he will retain his financial interest with the Greening Company.

Sir John Jackson, whose firm has the contract for the Victoria Harbor works, is now on his way to the coast. Sir John Jackson visited Quebec to inspect the work which his firm is carrying out on the harbor improvements there, and also spent some time in Montreal.

Mr. Percival Lancaster has been appointed city engineer and architect of Belleville, Ont., and also manager of the Belleville waterworks, succeeding Mr. James G. Lindsay, who recently resigned. Mr. Lancaster was formerly construction engineer for the Canadian Pacific on the Hastings Division.

Mr. Thomas Coltrin Keefer, C.M.G., LL.D. of Ottawa, past president of the Canadian Society of Civil Engineers and past president of the American Society of Civil Engineers, has been elected an honorary member of the Institution of Civil Engineers. The Institution is the largest and most representative of all engineering societies in the world and the honor accorded Mr. Keefer is a high one. In electing him an honorary member the members wished to recognize the distinguished part Mr. Keefer has taken in engineering enterprises which have added largely in the development and prosperity of the Dominion.

Mr. Isham Randolph, of Chicago, one of the experts engaged to report on water supply for the city of Toronto, has recently been awarded one of the Elliott Cresson medals for 1913 by the Franklin Institute, Philadelphia, for distinguished achievement in civil engineering. The other recipients are Mr. C. P. Steinmetz, Mr. Emile Berliner, Lord Rayleigh, Sir William Ramsay, and Dr. Emil Fischer, of Berlin. It is of interest to recall that Mr. Randolph was appointed by President Roosevelt on the board of consulting engineers for the Panama Canal, and that he was one of the five members of the board whose minority report was accepted by the President and on which the canal is now being constructed.

Mr. M. H. Baker, City Engineer of St. Thomas, has been appointed City Engineer of Prince Albert, Sask. Mr. Baker graduated from the School of Practical Science in 1906. A year later he completed his post-graduate course and obtained the degree of B.A.Sc. Mr. Baker has seen useful service with the Public Works Department of Saskatchewan, and later with the John S. Metcalf Engineering Company on the construction of the G. T. P. elevator at Midland. For a year he was engaged in the survey of Dominion lands in the Peace River district. He is duly qualified as an Ontario and Dominion Land Surveyor. He was appointed Assistant City Engineer of St. Thomas (under Mr. Jas. Bell) in the spring of 1910, and within a year, upon the resignation of Mr. Bell succeeded to his present office.

Mr. Arthur Surveyer, of Surveyer & Frigon, Consulting Engineers, Montreal, has been offered by the Government a position on the Waterways Commission. The Government are anxious that both he and Prof. C. H. McLeod, of McGill, and secretary of the Canadian Society of Civil Engineers, should devote their whole time to the Commission, but these gentlemen, we understand, do not see their way to give up their present positions. They are, however, willing to devote a portion of their time to the Waterways Commission, and the Government have this question now under consideration. Prof. McLeod, Mr. Arthur Surveyer and Mr. M. I. Gear, were members of the old Waterways Commission, but Mr. Gear resigned on the change of Government and the other two gentlemen had not done any work for several nonths.

Mr. Harry Webb has resigned his position with the City of Winnipeg to take a position with The Canadian Mineral Rubber Company, Limited, as local manager. The Canadian

Mineral Rubber Company, Limited, with offices at 503 Canada Building, Winnipeg, is identified with The American Asphaltum & Rubber Company. Mr. Webb is well fitted for his new position as he has gained a great deal of valuable experience in connection with the paving industry carried on by the City of Winnipeg. For five years he was in charge of the several plants operated by the city and during the last three years has been superintendent of all paving work in Winnipeg. He has instituted several new ideas on street paving which have given Winnipeg cheaper and better pavements. To-day, Winnipeg sheet asphalt pavement compares most favorably with that of other cities in America.

Canadian Contracting Concerns

S. M. Brookfield, Limited, Halifax

THERE have been three generations of Brookfields in the engineering and contracting business in Nova Scotia, and no other concern is so well known in that field at the present time as S. M. Brookfield, Limited. For more than half a century the Brookfields have been carrying on contracting work in Nova Scotia, New Brunswick and Newfoundland, and they have to their credit some of the greatest public works and buildings that have been erected during that long period.

Mr. S. M. Brookfield, Halifax

Back in 1852, John Brookfield, civil engineer and railway contractor, with two partners came out from England to build what was first called the New Brunswick and Canada Railway, afterwards the St. Andrews and Quebec Railway. This work was not completed, but Mr. Brookfield took contracts for several important sections of the European and North American Railway, now known as the Intercolonial Railway of Canada. Retiring from railroad work, he became the war department contractor for the British Government, and built most of the fortifications in Halifax Harbor, as well as the barracks, military hospital, and other buildings. Mr. Brookfield also built the new provincial building at Halifax. He was the most prominent engineer and contractor of his time in Nova Scotia, and all his work was of the highest character. He passed away in 1870.

Upon the death of John Brookfield, his son, Samuel M. Brookfield, who had been associated with him, took over the business. This Brookfield completed very important contracts, not only in Nova Scotia, but in Newfoundland and New Brunswick. His chief work, however, was done in Halifax, where he built the graving dock, three sugar refineries, the cotton factory, the Academy of Music, the Royal Bank Building, the Glebe House, St. Mary's School, and Fort Massey Church. He has also done a great deal of important work for the Imperial Government. His work in Newfoundland included the majority of the largest and most imposing structures in the city of St. John. There are thus many evidences of his skill and ability as a contractor, while he has also been one of the best known and highly esteemed citizens of Halifax. For years he was a director of the Halifax Graving Dock Company and President of the Eastern Canada Savings & Loan Company. He was the organizer of the Canadian Newfoundland Steamship Company, which, after six years of successful operation, was sold to the Furness Company.

But now there is another Brookfield, who is upholding with great success the reputation built up during more than half a century by his father and grandfather. We refer to John W. Brookfield, the son of S. M. Brookfield. He, with Henry Roper, who had been one of S. M. Brookfield's superintendents for seventeen years, was admitted to the firm in 1906, and they are now the active members of the firm. In Halifax they have built the Bank of Commerce, the new Y. M. C. A. building, All Saints Cathedral, and the Dennis office building, which is the largest in the city. They are now completing a building for the Merchants Bank of Canada, the new Woodside Refinery buildings, and others. As already stated, their work sustains the splendid reputation built up by S. M. Brookfield and John Brookfield, and they enjoy the confidence of the public throughout the province. Most of their work is done by private contract.

London's New City Engineer

Mr. William Norman Ashplant has been appointed City Engineer of London, Ont. Thirty-one applications were received for the position and the salaries asked ranged from $2,000 to $5,000 a year.

The new engineer of the Forest City is a native of the county of Essex, England. He was born in 1877 and at the age of sixteen was articled to Mr. Thos. Cockrill, A. M. Inst. C. E., with whom he obtained first-class experience in municipal and general practice.

Mr. Ashplant's professional career has been a varied one. Before he was twenty years of age he was at Cape Town in South Africa, fulfilling the duties of engineering assistant on the municipal sewerage scheme which involved an expenditure of $1,250,000. He remained at Cape Town until 1902, when he went to Port Elizabeth as chief assistant on general municipal engineering work, which included the installation of sewerage and storm water drainage systems at a cost of $1,600,000. He took part in the design of an extensive sewerage scheme for Pretoria, in the Transvaal, and later was employed by the city of Johannesburg on important water and sewerage schemes. In 1908, Mr. Ashplant received an engineering appointment in the West Indies under the Government. He remained there until 1911 when he went to West Africa as assistant engineer for the Government, on the construction of waterworks, filtration and other plants at Lagos and elsewhere. He remained in West Africa until 1912.

Mr. Ashplant has a number of family connections in London, Ont., and is by no means a stranger to the Forest City.

The city of Regina have decided, on the recommendations of the fire, light and power committee, to amend their building by-law by the first of April next.

Mainly Constructional

The News in Brief—From Coast to Coast

Building permits for the week ending February 22nd at Vancouver amounted to $1[illegible],515.

Plans are being prepared for a warehouse for Gaults, Limited, at Winnipeg, to cost $60,000.

It is expected that the cost of Ottawa's new waterworks system will be in the neighbourhood of $7,000,000.

The Board of Education of London, Ont., are considering the advisability of appointing a permanent architect.

Tenders will be called for shortly for the construction of the new infirmary for the Sisters of Charity, at St. John, N.B.

The town of Beaconsfield, P.Q., has given a 25 years exclusive contract for the supply of water to the Vaudreuil Springs Syndicate.

A special meeting of the Toronto council will be held on March 18th to discuss the new building by-laws. Builders will be invited to attend.

A large bed of asphalt has been discovered at Morinville, Alta. It is reported that the asphalt runs to within five feet of the surface and can be operated easily.

Mr. Willis Chipman, Toronto, has recently made a report on the waterworks system of Collingwood, Ont. Mr. Chipman estimates that $72,000 will be required to put the system into first-class condition.

The Orpheum Theatre, at Vancouver, was completed recently at a cost of approximately $300,000. This building is five storeys high and is built of steel with reinforced concrete floors, the walls being of brick and terra cotta.

The Government's plans for the improvement of the harbour at Fort William include the construction of a large slip, paralleling the present one, already completed at the Grand Trunk Pacific Elevator plant on the Mission River.

Permits for the erection of 305 new buildings, of the approximate value of $1,549,210, were issued by the Toronto City Architect' Department last month, as compared with 330 permits for buildings valued at $1,333,915 in February last year.

Work has been started on the new police station at Vancouver. This building has been specially designed to furnish the most up-to-date accommodation. Including the ground floor the building will be a six-storey one and will cost approximately $300,000.

A charter has been granted to the Imperial Marble Company, a Toronto concern, with a capital of $1,000,000, organized to promote properties said to be of considerable value now in the company's possession, and to refine and market the product.

On March 4, Mr. William H. Connell, Chief of Bureau of Highways and Street Cleaning, Philadelphia, Pa., delivered an illustrated lecture on "Organization of Municipal Highway Departments," before the Graduate Students in Highway Engineering at Columbia University.

The Siemens Company of Canada recently obtained the order for 2-1900 h.p. peak load electric hoisting engines for the Dominion Coal Company, Nova Scotia. The Siemens Company has also supplied this firm with other large electric hoisting engines, and has furnished a total of 10,000 h.p. electrical machinery.

Three Montreal experts, Messrs. Walter J. Francis, R. A. Ross and R. S. Lea, have investigated the water supply of Edmonton, and have decided that the only scheme is to get a supply from the present intake. They also told the City on what scale to prepare for future expansion. The bill of the experts totalled $15,798.

The contract for supplying the hollow tile to be used in the big plant of the Canadian Car and Foundry Company, Fort William, has been secured by the Superior Brick and Tile Company. Mr. Ayer, the manager, states that the contract will take the entire output of the plant for four months, and that the process of tile making will begin about April 15 next.

Another recommendation in favor of the widening and extension of Teraulay street, Toronto, at an estimated cost of $4,250,000, was sent on to Council by the Civic Works Committee recently. The new scheme for this much-discussed improvement varies from previous ones, to the extent that it is proposed to make the new thoroughfare 86 feet wide from Queen street to Davenport road.

It is expected that the 1,500 barrel plant of the Edmonton Portland Cement Company at Marlboro, Alta., will be in operation next month. The establishment represents a total investment of $1,500,000, of which $1,250,000 is for buildings, machinery and a site of 1,200 acres. This includes 1,120 acres of marl deposits and 80 acres of blue clay. The mill is one of the modern wet process type, the machinery alone costing upward of $500,000. Builders in Edmonton are contracting for the first year's output.

For some time, negotiations have been in progress for the amalgamation of the Dominion Steel Castings Company, Limited, and the Hamilton Malleable Iron Company, Limited, both of Hamilton, Ont. The deal has not gone through yet, but it is expected to be closed in the near future. Plans of the two companies involved have not yet taken definite shape, but it is said to be the intention to form a holding company, capitalized at $3,000,000. It is expected that the merger will employ between 500 and 700 men.

At the tenth annual meeting of the Western Ontario Clay Workers' Association, held recently at Windsor, Ont., the following officers were elected: Mr. Aug. Wehlann, of Rodney, president; Mr. Ben. Broadwell, of Kingsville, first vice-president; Mr. G. W. Moody, of Highgate, second vice-president; Mr. A. Wehlann, of Cairo, re-elected secretary and treasurer. The executive committee: Mr. W. McCredie, Lyons; Mr. J. T. Miner, Kingsville; Mr. B. Broadwell, Kingsville, and Mr. G. W. Moody, Highgate. The auditors: Mr. A. W. Hill, of Essex, and Mr. Jno. Wardle, of Blenheim.

The plant of the Ontario National Brick Company, Limited, at Cooksville, seventeen miles from Toronto, will soon be completed and ready to commence operations. The P. Lyall Construction Company have over three hundred men at work on the erection of steelwork for the machinery building, and finishing the construction of the three big kilns, and in the erection of the gas producing plant. With the great number of men at work it is expected that the entire plant will be ready to manufacture in large quantities on or before the first of May, the capacity of the plant being 300,000 bricks per day. The Canadian Pacific Railway has run three spur tracks right into the works alongside the kilns, making it possible to load and ship bricks immediately they are dried. The operation of this plant, in such close proximity to Toronto, is expected to go a long way towards relieving the brick situation in this city. Ontario National Brick Company, Limited, is the new brick company organized a couple of months ago by interests closely connected with the National Brick Company, of La Prairie, P.Q. The Board of Directors is made up of the following gentlemen: J. N. Greenshields, K.C., J. W. Pike, Hon. Robt. MacKay and John McKergow, of Montreal, and Thos. Long, of Toronto.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Bridgetown, N.S.
Paving, cost $6,000. Mayor, Karl Freeman. Clerk, Harry Ruggles. By-law passed and work will now go ahead.

Cowansville, Que.
Macadamizing roads. Council has arranged to borrow $50,000 from the Prov. Govt. under The Good Roads Act. Engineer in charge, L. A. Vallee, Govt. Engr., 80 St. Cyrille, Que. Address, J. I. McCabe, Cowansville.

Drummondville, Que.
Town council will receive tenders until April 1st for 1 reservoir, stand pipe, capacity 200,000 gals., 1 reservoir, stand pipe, capacity 300,000 gals. Sec.-Treas., W. A. Moisan.

Edmonton, Alta.
Street cleaning plant, cost $58,400, contemplated by city council. Mayor, Mr. Short. Engineer, A. J. Latornell. Specifications will be at office of Engineer, shortly. By-law passed February 24th, 1913.

Hull, Que.
Waterworks, cost $50,000. Mayor, Dupuis. Plans will be prepared for extensions and improvements. Engineer-in-charge, J. A. Laforest, C.E.

Montreal, Que.
Sewers, cost $235,949, will be constructed in the following wards this year: Longue Pointe, $137,250; Notre Dame de Grace, $40,500; St. Denis Ward, $7,500; Rosemount Ward, $18,200; Hochelaga Ward, $3,859; Bordeaux Ward, $17,000; Mount Royal Ward, $3,400; St. Gabriel Ward, $3,860; St. Henry Ward, $1,280; St. Andrew's Ward, $1,100.

New Toronto, Ont.
G. T. Rly. Co. has been authorized to lay and maintain additional 6 in. water main 4 in. below surface of ground, to convey water from Lake Ontario, to its railway terminals in New Toronto across Lake Shore road under Toronto & York Radial Ry. Co. along 6th street and across New Toronto street.

Owen Sound, Ont.
Cement plant, cost $40,000, for Ben Allen Portland Cement Co. Manager, W. McLeod. Architect to be chosen. Various manufacturing buildings planned, machinery required for a 100-barrel per day output. White brick construction, cement foundation, electric lighting.

Saskatoon, Sask.
Material for water connections. Chairman, Mayor F. E. Harrison. Engineer, Geo. T. Clark. Tenders received by City Commissioners until March 21st, for supply of the following: [illegible] lin. ft. of 2 in. galvanized iron pipe; 2,000 lin. ft. of 1 in. galvanized iron pipe; 15,000 lbs. of ¾ in. lead pipe; 10,000 lbs. of 1 in. lead pipe; (b) 60-2 in. curb cocks iron to iron similar to Mueller D 6164; 600-¾ in. curb cocks lead to lead similar to Mueller D 5354. 500-¾ in. main cocks similar to Mueller D5051; 300-1 in. main cocks similar to Mueller D5051; 100-¾ in. lead to lead unions similar to Mueller D5001; 600-¾ in. iron to iron unions similar to Mueller D5002; 160-1 in. iron to iron unions similar to Mueller D5002; 48-4 way branches similar to Mueller D5103, without goose necks and main cocks; (c) 1,100 service boxes complete; (d) 1,000 ⅝ in. meters; 10 1½ in. meters; 20 2 in. meters; 2 3 in. meters. Specifications, etc., at office of Engineer.

St. John, N.B.
Road machinery. Miles Agar, commissioner, was authorized to purchase machinery for new street plant, including two large steamer road rollers, a smaller motor roller, portable stone crusher, motor truck and hot mixer for bituminous concrete, plant to cost $16,000.

Sault Ste. Marie, Ont.
Cement sidewalks, cost $29,000; sewers, $37,000; sewer outlets, $13,000. Mayor, T. E. Simpson. City clerk, C. J. Pim. Chairman Board of Works, Geo. A. Boyd. City engineer, W. W. Van Every, City Hall. By-law has been passed.

Toronto, Ont.
Asphalt pavements planned. Ossington avenue, $17,802; Greenlaw, $12,233; Harvie avenue, $12,870; Wellington St., $24,132; Talbot, $3,356; Woodbine, $15,668. Mayor, H. C. Hocken. Works Commissioner, R. C. Harris.

Welland, Ont.
Tenders received by Clerk, George Boyd, until March 15th for about 2 miles concrete sidewalks. Specifications, etc., at office of Contract Record and Engineering Review, Toronto, and Town Engineer's office, Welland. Chairman R. & B. Com., H. L. Hatt.

Winnipeg, Man.
[illegible] and watermain. Sewers on Hugo, Helen, Weatherdon, Wilton, Lilac, Clifton, Strathcona, Saskatchewan, Richard, St. James, Manitoba, McGregor, Bannerman, Sinclair, Thames and Union streets, also watermain on Albany street from Selkirk to Pritchard. Plans and specifications at office of Engineer. Tenders received by Secretary until March 11th. Board of Control. Secretary, M. Peterson. Engineer, H. N. Ruttan, 223 [illegible] avenue.

CONTRACTS AWARDED

Montreal, Que.
Watermain. General contractors, Laurin & Leitch, 5 Beaver Hall Square, furnishing and laying 36 in. steel main across Lachine Canal at Wellington St. bridge. Secretary, L. N. Senecal. Engineer, Geo. Janin, City Hall.

Filtration plant, cost $10,000, one million gallons for Longueuil. Mayor, H. St. Mars. Contract was awarded to John McDougal Co., 512 William street.

Railroads, Bridges and Wharves

Province of British Columbia
Grand Trunk Pacific Railway Company's location of stations at the following places, have been approved at Andimaul, mileage 153.0; Carnaby, mileage 169.9; Ritchie, mileage 132.0; Kitwanga; mileage 153.3, and Nash, mileage 162.7.

Burlington, Ont.
Revetment wall. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

County of Bruce, Ont.
Tenders received by S. K. Ewart, Chesley, Ont., until March 17th for concrete abutments on steel bridge over Saugeen River, between Twps. of Brant and Elderslie, Co. of Bruce. Plans and specifications at office of S. K. Ewart, Chesley, P. A. Malcomson, Kincardine, and Frank Barber, Toronto. Engineer, Frank Barber, 57 Adelaide street east, Toronto.

Cape Tormentine, N.B.
Car ferry terminal. Dom. Govt. Dept. of Railways and Canals. Secretary, L. K. Jones, Ottawa. Tenders received by Secretary until 16 o'clock April 8th. Plans, specifications, etc., at office of Chief Engineer of Dept., Chief Engineer, Intercolonial Railway, Moncton, N.B., Horace McEwen, Supt. of the P. E. I. Rly., Charlottetown, P.E.I., and at the office of the I. C. Rly., Ticket Agent, 107 Hollis street, Halifax, N.S.

Cobourg, Ont.
C. L. O. & W. Rly. (C. P. R.), Co.'s revised location of part of line from Cobourg, near William street, at mileage 120.34 to a point in E. ½ lot 25 Con. "A" Twp. Hamilton, mileage 121.98 has been approved and authorizing its construction across G. T. R. by means of a bridge at mileage 121.03 in W. ½ lot 21 Twp. Hamilton.

Edmonton, Alta.
Street railway extensions, cost $1,543,220, planned by city council. Engineer, A. J. Latornell. Railway Inspector, Jno. Moir. By-law passed on February 24th, 1913.

Grand Falls, N.B.
Bridge planned by Prov. Govt. across the St. John River at Grand Falls. Minister of Public Works, Hon. J. Morrisey, Fredericton, N.B.

Hamilton, Ont.
Incline railway, [illegible] contemplated by Hamilton Incline Co. (Geo. F.

[illegible] street. Engineer, C. [illegible] & Son, Pittsburg, Pa. Com[illegible] to approve plans Railway, 1,000 ft. long; lift, 319 ft.; boiler [illegible]

Twp. Janes, Ont.
[illegible] Rly. Co. has been authorized to construct bridge across Sturgeon River, West Crossing, Twp. Janes, Dist. Nipissing, Ont., at mileage 280.3 from Ottawa.

Kootenay District, B.C.
Railroad. C. P. Rly. Co.'s revised location of line from a point in lot 264 Kootenay Dist., at mileage 36 to a point in lot 334 Kootenay Dist., mileage 38.35 B.C., has been approved.

Marlboro Twp., Ont.
Tenders will be received by Clerk until April 1st for bridge (between Counties of Carleton and Lanark), opposite Lot 30, 1st Concession Marlboro. Plans, specifications, etc., at office of County Clerk, Chas. McNab, Ottawa, and Mr. Pattie, Carleton Place, Ont.

Meductic, N.B.
Railway bridge for St. John and Quebec R. R. Co., Woodstock, N.B. President, A. R. Gould, Presque Isle, Maine. Engineer-in-charge, Ross Thompson, Fredericton, N.B. Surveys have been [illegible]

Province of New Brunswick
D. H. Lamont, John McIntosh, Robert Ronald of Glassville Car Co., N.B., and Dr. Somerville, of Bristol, N.B., are applying to the Legislature of N.B. for a charter to build a steam railway from Bristol, in Carleton Co., to a point on the Transcontinental Rly. at Juniper Brook.

Ottawa, Ont.
Electric railway for Morrisburg & Ottawa Electric Rly., Canada Life Bldg. President, J. G. Kilt, Citizen Building. Tenders and specifications being prepared for 15 miles of track, this is the 1st portion of work, tenders expected to be called this month. Engineer-in-charge, Company's engineer, Canada Life Building.

Port Arthur, Ont.
Railway material. Tenders received by Commissioner of Utilities, J. J. Hackney, until March 31st, for the following: 80 lb. 5 in. T rails, 24,200 ft.; 60 lb. 5 in. T rails, 50,000 ft.; spikes, 5½ x 9-16, 76-500 ft. angle bars, 80 lb. rail; 4-hole, 840 ft.; angle bars 60 lb. 4-hole. 1,700 ft.; bolts, 8¾ x ¾; hex. nuts, 6,800; bolts, [illegible] x ⅞; hex. nuts, 3,360. Engineer, L. M. Jones.

Province of Saskatchewan
C. P. Rly. Co.'s location of its Kerrobert North-Easterly Branch from mileage 20.2 at a point in N.E. ¼ Sec. 4-37-21 W 3 M, to mileage 36.10 a point in S.W. ¼ Sec. 6-39-19 W 3 M, Sask.

C. N. Rly. Co.'s locations of stations at Parkham, Swanson and Truax, Sask., have been approved.

St. George, N.B.
Plans are being prepared for 3 concrete dams to manufacture electricity for St. George Hydro-Electric Co. Cost $1,500,000. President, Percy W. Thompson, St. John, N.B.

Sault Ste. Marie, Ont.
Concrete culverts, cost $10,000. Mayor, F. E. Simpson. City clerk, C. J. Pim. Chairman Board of Works, Geo. A. Boyd. City engineer, W. W. Van Every, City Hall. By law has been passed.

St. John, N.B.
Railway bridge, Reversing Falls, for C. P. R. Co., Head Office, Montreal. Supt., William Rownie, St. John, N.B. Steel structure. Plans in progress.

Salmo, B.C.
The Great Northern Ry. Co.'s plan showing station has been approved.

Sidney, B.C.
The Victoria & Sidney R. R. Co. have filed plans for wharf to be 500 ft. long, embracing freight derricks, sheds, passenger building, etc.

Toronto, Ont.
C. P. R. Co.'s plan No. 50445, showing proposed subway at Keele street, West Toronto, has been approved.

Victoria, B.C.
The Esquimalt & Nanaimo Rly Co. has been authorized to construct siding for the Red Wing Lumber Co., at mileage 1.25, Victoria, B.C.

Winnipeg, Man.
150,000 duct ft. of clay conduit for seasons requirements. Specifications at office of engineer. Tenders received by Secretary, M. Peterson, Board of Control, until March 14th. Engineer, J. G. Glassco, 54 King street.

CONTRACTS AWARDED

Province of Manitoba
Bridge on the Bredenbery Division of the C. P. R. General contractors, The Manitoba Bridge & Iron Works.

Vancouver, B.C.
Bridge, cost $470,350, Georgia Harris. Clerk, Wm. McQueen. Engineer, C. A. P. Turner, Room 601 Canada Building, Winnipeg. General contractors, J. McDiarmid & Co., 705 Canada Building, Winnipeg.

Winnipeg, Man.
Six bridges for C. N. Rly. on Western Division. General contractors, The Manitoba Bridge & Iron Works, Logan avenue west, Winnipeg.

Public Building, Churches, Schools, etc.

Edmonton, Alta.
The council accepted the recommendation of the library board to accept $75,000 from Andrew Carnegie for a library and passed a resolution to raise $175,000 in addition for the building. Architect, A. Jeffers, City Architect.

By-law passed on February 24th for $84,680 for 4 fire and polic stations combined, also $85,000 for equipment for equipment for these. Architect, A. J. Jeffers, City Architect.

Edmonton, Alta.
Church, contemplated for The Erskine Presbyterian Congregation. Building Committee, Robert, McLennan, Alex McSporran, A. S. Magee.

Frelighsburg, Que.
Alterations and additions to town hall. Mayor, E. E. Spencer. Architect, C. E. White, 137 Wellington street, Sherbrooke. Tenders will be received by Secretary of Municipality after March 15th. Two storeys, addition 35 x 70, stone, cement and brick foundation, frame, brick-cased construction.

Hobbemma, Alta.
Tenders received by Secretary until March 31st for erection of farm house on the Hobbemma Reserve. Dom. Govt. Dept. of Indian Affairs. Asst.-deputy & Sec., J. D. McLean, Ottawa. Plans, specifications, etc., at Dominion Land Offices at Edmonton and Wetaskiwin, Alta, and Mr. Markle, Insp. of Indian Agencies, Red Deer, Alta, and Dept., Ottawa.

Holland, Man.
School, cost $25,000, for Rural Munipality of Victoria. Sec.-Treas., A. W. Goulding. By-law will be submitted shortly.

London, Ont.
School, cost $6,500, contemplated for Jewish Sect. Chairman of Commission, A. Hartman, 300 Dundas street. Architect not yet chosen. One storey, cement foundation, brick construction .

Montreal, Que.
Public bath, cost $30,000. Emard Ward, Rielle street. Architect, A. Chausse, City Hall, Montreal, has prepared plans.

Municipal hall, planned by council, Westmount. To replace building sold to school commissioners. Architect, M. Currie, 21 Stanton street.

Montreal West, Que.
Fire and police station, cost $15,000. Architect, Mr. Ward, City Hall, is preparing plans.

Napanee, Ont.
Drill hall, cost $50,000. Dom. Govt. Dept. of Militia and Defence. Secretary, E. F. Jarvis, Ottawa. Site has been selected, and plans will be prepared.

Newcastle, N.B.
Sunday school, cost $7,000, for Presbyterian Congregation. Plans in progress.

Oakville, Ont.
Orphanage, planned by I.O.F., Temple Building, Toronto. Architects, Bovell & Molesworth, 449 Yonge street, Toronto. Tenders to be called shortly.

Port Colborne, Ont.
Public building. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Petrolea, Ont.
Picture theatre, cost $7,000, for Harry Rotsky, manager of Wonderland Theatrea, Petrolea and Centre streets. Two storey, white brick construction, stone and cement foundation, maple and fireproof floors, felt and gravel or patent roofing. Plans in progress.

Preston, Ont.
School, cost $10,000, contemplated for Catholic Church (Father Gehl). Architect to be chosen. Two storeys, stone and cement foundation, stone trimmings.

Sackville, N.B.
Public building. Dom. Govt. Dept. of Public Works. Secretary, R. C. Des-

rochers, Ottawa. Tenders will be called shortly.

St. John, N.B.
Extension to hall, Cobourg, for Knights of Columbus ,St. John Council No. 937. Architect, H. Mott, 13 Germain street. To have auditorium to accommodate 500 people, floor space 66 x 37, steel girders. One storey, brick construction. Plans drawn.

Sunday school building, cost $25,000, Germain, for Germain street United Baptist Church. Pastor, F. S. Porter, Queen street. Architect, Geo. Kromer, New York, U.S.A., and F. Neil Brodie, 42 Princess St., St. John. Tenders will be called shortly. Two storeys, 64 x 84, cement foundation, stone trimmings, brick construction.

Shanty Bay, Ont.
Mausoleum, cost $5,000, for Judge MacWatt, Sarnia. Architects, R. J. Edwards & Saunders, 18 Toronto street, Toronto. One storey, 12 ft. 6 in. x 24 ft. 6in., brick, reinforced concrete and cut stone construction, stone foundation, tile roofing and floors. Tenders to be called.

Shediac, N.B.
Public building. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

St. Catharines, Ont.
Alterations and addition to church, cost $8,000, for Welland avenue Methodist Congregation. Tenders received by Architect, A. E. Nicholson, from March 15th to 30th. New entrance, organ, choir loft, oak floors.

South Vancouver, B.C.
Fire halls and equipment, cost $119,000. Fire chief, Mr. Lester. Estimates includes: Sites for 5 stations, at $3,000 each; 5 fire halls, at $9,000 each; 3 hose and chemical wagons, at $200 each; 6 horses, $400 each, 2-piece combination motor apparatus, $8,000 each, rubber-lined hose, $5,500; auto for fire chief, $3,000; complete Gamewell fire alarm system, $500; also 5 sliding poles, 3 double sets of harness, and 5 sets door springs.

Toronto, Ont.
Addition to school, Gerrard street E. Tenders received by Sec.-Treas., W. C. Wilkinson, City Hall, Board of Education, until March 14th for all trades. Plans, etc., at office of Building Superintendent Bishop.

Fire hall, Roncesvalles and Wright, contemplated by Board of Control. Mayor, H. C. Hocken. Plans in progress.

Vancouver, B.C.
Bachelors club building, cost $20,000, Nelson street, for W. Able, c/o Architects, Stuart & White, 837 Hastings St. W. Tenders will be called about March 18th, 1913. Three storeys, frame and brick veneer construction.

Walkerton, Ont.
Curling rink, cost $6,000, [illegible] street for Walkerton Curling Club. President, C. Smith, Yonge street. 160 x 50, frame construction. Plans will be prepared.

Wingham, Ont.
Addition to hospital, cost $7,000, contemplated. President of Board, Dr. Ker

nedy. Architect to be chosen. Cement foundation, white brick construction.

Winnipeg, Man.
Hospital, cost $10,000, Burrows avenue, contemplated by The Ladies Auxiliary, c/o Mrs. C. F. Czerwinski, 645 Bannatyne avenue. Architect not yet appointed, nor site secured.

Schools, cost $22,000, contemplated for Municipality of Kildonan. Sec.-Treas., H. Thompson, 215 Chambers of Commerce. By-law will be submitted shortly to raise money to purchase sites.

Woodstock, Ont.
Addition to collegiate institute, planned by High School Board. Tenders received by Architect, B. McNicol, 499 Mary street, until March 19.

CONTRACTS AWARDED

Dauphin, Man.
Church, cost $15,600, for The Anglican Congregation. Pastor, Rev. A. Wiley. General contractor, Mr. Banks, c/o Architect, H. Bossom. 82 x 75 x 58 high and basement, brick and frame construction, cement foundation.

Drummondville, Que.
Theatre, for E. Pinard. Architect, Francis Gauthier has prepared plans. Work being done by day labor. Excavation started.

Kenora, Ont.
High school planned by Board of Education. Sec.-Treas., M. Seegmiller. Architect, F. A. Hudson. General contractor, W. M. Scott, 204 Sterling Bank Building, Winnipeg, Man. The contract does not include heating, drainage or sewer connections. Building to start as soon as possible, school to be completed by September 1st.

Kingston, Ont.
Church, cost $23,620, for First Baptist Congregation. Pastor, Rev. Douglas Laing, Johnson street. Architect, Arthur Ellis, King street. General contractor, J. M.Litton, 81 Frontenac. Two storeys, 80 x 40, stone foundation and construction.

Milverton, Ont.
School, cost $15,000. Clerk, W. D. Weir. General contractor and builder, John Boshart.

Ottawa, Ont.
Hall, cost $10,000, Division street, for Episcopal Corp. of Ottawa. General contractors, Rockburrie & Singi, 12 Elm street. 48 x 66, brick veneer construction, cement foundation.

Toronto, Ont.
Theatre, cost $[illegible],500, Greenwood Ave. Owners and builders, Pye & Brickenden, 657 Carlaw avenue. Brick foundation, structural steel and brick construction.

Winnipeg, Man.
School, cost $60,000, for Municipality of Kildonan. Sec.-Treas., H. Thompson, 215 Chambers of Commerce Building, Winnipeg. Architect, Edgar Prain, 313 Fort street, Winnipeg. General contractors, S. Brynjohfsson & Co., 518 Builders Exchange, Winnipeg. Eight rooms and assembly hall, cement foundation, brick construction.

School, cost $14,000, Polson avenue, for East Kildonan School Board. Sec.-Treas., H. Thompson, 215 Chambers of Commerce Building, Winnipeg. Architect, E. G. Sherwood, 3 Commonwealth Block, Winnipeg. General contractors, Worswick Bros., Hart avenue, Elmwood. Two storeys and basement, 42 x 64, stone foundation, brick construction.

School, cost $20,000, Jefferson avenue, for Municipality of Kildonan. Sec.-Treas., H. Thompson, 215 Chambers of Commerce Building, Winnipeg. Architect, Edgar Prain, 313 Fort street, Winnipeg. General contractors, Moran-Berge-Buckingham Co., 415 Somerset Building, Winnipeg. Four rooms, felt and gravel roofing.

Business Buildings and Industrial Plants

Berlin, Ont.
Addition to Walker House (Jos. Zuber, King and Queen streets), cost $70,000. Architects, G. M. Miller & Co., Toronto, General Trusts Building, Toronto. Tile throughout the whole building. Plans in progress.

Brantford, Ont.
Office building, contemplated for Brantford Roofing Co., Sydenham street. Manager, Fred Chalcraft. Plans have not yet been decided on.

Dorchester, Ont.
A. Carrothers has purchased the old Anglican Church. Will remodel it and purchase machinery and equipment for flour mill.

Edmonton, Alta.
Warehouse and office, etc., for The International Harvester Co., North Battleford, Sask. Five storeys, to accommodate 135 carloads of machinery. To be erected on Industrial spur. Work will start in spring.

Fort George, B.C.
The Cariboo Timber Co. will erect saw mill with daily capacity of 25,000 ft. as soon as navigation opens.

Fraser Lake, B.C.
Hotel, for John W. Smith. Work will start as soon as possible. Plans ready.

Hamilton, Ont.
Bank building, 54-56 King street, planned for Bank of Nova Scotia, head office, Toronto. Tenders are now being received for the wrecking of the old building.

Two stores and apartments, cost $10,000, James street, for R. Phillips, 481 King street east. Architect, Jas. Balfour, 36 James street. Tenders close with Architect about March 20th.

Two stores and apartments, cost $10,000, Barton street, contemplated for Joseph [illegible]. Architect not yet chosen.

Alterations to stores and apartments, cost $7,000, contemplated for [illegible], [illegible] King street east. Architect not yet chosen. One storey addition, structural steel construction.

Stores and apartments, cost $[illegible], East end, for W. R. Turnbull, 42 Ontario street. Architects, Stewart and Witton, [illegible] Three storeys. Plans in progress.

Kelowna, B.C.
[illegible] will erect large up-to-date store building at once on Pendozi street.

London, Ont.
[illegible] plant, cost $40,000, for [illegible] Hall. Plans are under way for [illegible] a large new [illegible] manufacturing plant, complete general equipment will be required.

Biscuit factory, cost $250,000, East, for McCormick Manufacturing Co., Wellington and Dundas streets. Manager, Geo. McCormack. Tenders received by Architects, Watt & Blackwell, Bank of Toronto Building, until March 17th. Plans at offices of Architect in London and 125 Lister Chambers, Hamilton.

Hotel, contemplated for Grand Trunk Railway, Head office, Montreal, Que. Plans will be prepared.

Ottawa, Ont.
Business building, cost $50,000, for R. W. Stephen, 217 Queen street. Five storeys, reinforced concrete and structural steel construction. Plans in pro-[illegible]

Petrolea, Ont.
Blacksmith shop, cost $4,800, Petrolea street, for James Stone. New tools, forge, etc., required. White brick. Plans in progress.

Port Arthur, Ont.
Addition to dry goods store, cost $10,000, one storey, 110 x 40, for I. L. Matthews, Park street. Plans will be prepared.

Port Mann, B.C.
Car manufacturing plant planned for The Imperial Car Manufacturing Co., Pittsburg, Pa. To have capacity of 10 steel freight cars per day.

Preston, Ont.
Business block, cost $10,000, for George Roth, King street. Two storeys, 31 x 70, white brick, stone and cement foundation. Plans in progress.

Rodney, Ont.
Greenhouses, cost $20,000. A syndicate has secured 11,000 acres and plan to build extensive greenhouses, heating equipment, glass, frames, etc., required. Dr. Campbell, of Wheatley, Ont., is interested.

Scotstown, Que.
Store, Victoria and Mill avenue, for Scott Bros. Site has been purchased and plans will be prepared.

Strathroy, Ont.
Auto factory, cost $75,000, for Royal Motor Car Co. (T. H. Dunn, c/o Cameron-Dunn Co.) Architect, Owner. By-law has been voted on and carried by ratepayers. Two storeys, 400 x 100, reinforced concrete, cement foundation.

Toronto, Ont.
Store and apartments, cost $10,000, Bloor west, for Jas. Carolan, 623 Queen west. Tenders to be received by Archi- J. H. Stanford, Bloor and Ossington. Three storeys and basement, 50 x 40, stone foundation, brick construction.

Vernon, B.C.
Company will be formed to enlarge the Vernon Hotel by brick addition, 80 x 110 ft. on the east side of present building. Address, S. D. McClellan.

Wiarton, Ont.
Repairing office and store, cost $7,000, for Robinson & McLure, Fielding Block. Electric lighting, hot water or steam heating, felt and gravel or patent roofing. General office and store equipment required. Plans in progress.

Winnipeg, Man.
Store, cost $4,000, for A. Beck, 515 Selkirk avenue. Architect, E. W. Crayston, 572 Ross avenue, is preparing plans. One storey and basement.

CONTRACTS AWARDED

Barrie, Ont.
Alterations and extension to boot and shoe factory, cost $10,000, Dunlop street, for Underhills, Ltd., Barrie and Aurora. General contractor, Albert E. Stapleton. Four storeys, new part, 48 x 40, 2 stys. to old part, 64 x 40, brick, cement foundation.

Calgary, Alta.
Washhouse, cost $6,000, for Calgary Brewery and Malting Co., general contractors. Architect, Bernard Barthel, Chicago, Ill. Three storeys, 32 x 60, cement foundation, reinforced concrete, structural iron and steel, brick construction. Excavation started.

Edmonton, Alta.
Storage warehouse and office, cost $60,000, Seventh, for Lees & Persse, Ltd. General contractors and architects, McNeil & Trainer. Six storeys, 50 x 134, cement foundation, brick construction, felt and gravel roofing.

Work shop, cost $4,000, for Edmonton Metal Works, Ltd. General contractor, Mr. Carmichel. One storey, 100 x 33½, cement foundation, frame and structural steel construction. Excavating started.

Essex, Ont.
Business building, cost $3,600, Talbot street. Owner and Builder, Ed. Wall. One storey, 36 x 60, white brick construction, cement foundation.

Hamilton, Ont.
Stores and apartments, cost $10,000, for P. J. Colvin, King and Sherman Ave. Builders and general contractors, Sparks & MacKay, 133 Cannon street east.

Montreal, Que.
Addition and extension to dye works, cost $30,000, Notre Dame East, for Dom. Textile Co., Liv. Lon. & Globe Building, St. James St. Architects, T. Pringle & Sons, 419 Coristine Building. General contractors, Bishop Construction Co., 904 E. T. Bank Building. Four storey addition extension, 65 x 19, stone, reinforced concrete and brick construction.

Ottawa, Ont.
Alterations to business building, cost $6,000, Sparks street, for C. Jackson Booth, 252 Metcalfe. Builder, Alex Christie, 359 Elgin. Solid brick construction.

Peterboro, Ont.
Extension to spinning plant, cost $12,000, for Bonner, Worth Co., Ltd., McDonnel & Cambridge streets. Architect and general contractor, Wm. Langford, 592 Water street. Two storeys and basement, 70 x 80, white brick construction, stone foundation, concrete.

Preston, Ont.
Billiard Rooms and barber shop, cost $7,000, King street. Owner and builder, Oliver Ward. Two storeys, 30 x 40, white brick construction, cement foundation.

Toronto, Ont.
Biscuit factory, cost $60,000, Sterling road, for Telfer Bros., Ltd., Collingwood, Ont. Architects, Chadwick & Beckett, 20 Toronto street. Mason, Davidge & Lunn, 684 Barthurst street. Carpenter, Frank Armstrong, 89 Oak street. Four storeys and basement, terra cotta, structural steel and reinforced concrete construction.

Four stores, cost $12,000, Dundas St. Architect and builder, M. Sheinkman, 30 Kensington Place. Owner doing work by day labor. Two storeys, 60 x 46, stone foundation, brick construction, concrete.

Addition to factory, for American Watch Case Co., 511 King street west. Architect, G. W. Gouinlock, Temple Building. Mason, Wickett Bros., 35 Deer Park Crescent. Carpenter, Jas. Sim, 372 Markham street. Four stys., stone and brick construction.

Factory and warehouse, cost $100,000, Simcoe street, for Northern Elec. & Mfg. Co. Ltd. Engineer-in-charge, Mr. Dawes, 126 Bay street. Builders, Clarke & Monds, 152 Bay street. Heating and plumbing, General Fire Extinguisher Co., 1200 Dundas. Cement foundation, reinforced concrete, structural steel and brick construction.

Store and residence, cost $6,000, Gerrard and Pape, for Wm. Davies Co., Ltd., 521 Front St. E. Builders, A. Clark & Son, 90 Farnham avenue. Two stores, 24 x 52, brick foundation, structural steel and brick construction.

Vancouver, B.C.
Addition to brewery, cost $75,000, 11th and Yew streets, for The Vancouver Breweries, Ltd., 263 7th avenue east. General contractors, The Sound Construction and Engineering Co., 72 Hutchinson Building. Two storeys, and 5-storey addition.

Office building, cost $45,000, Seymour street, for The Standard Trust & Industrial Co., 433 Seymour street. Architects, Braunton & Liebert, 142 Hastings street west. General contractors, Hoburg, Surges Co., 119 Pender street west. Four storeys, 25 x 120, concrete construction, marble. Tenders received by General Contractors for reinforced concrete, electric work, plastering, terrazzo, marble and tile.

Victoria, B.C.
Hotel, cost $20,000, Store and Discovery streets. Owner, McPherson & Fullerton Bros., 616 View street. Architect, Jesse M. Warren, 503 Central Building. General contractors, The B.C. Construction Co. Three storeys and basement, 37 rooms, brick and mill construction, pressed brick front.

Stores, cost $12,000. General contractors, J. R. Bowes & Co., 643 Fort St. Architect, Jesse M. Warren, 503 Central Building. Brick construction. Work to be done by day labor.

Welland, Ont.
Forge plant, for Canada Forge Co., Ltd. General contractors, The Standard

Steel Construction Co., Welland. Building to replace that destroyed by fire. Crane runway of 50 ft. span will be installed with one 20-ton and two 5-ton electric cranes.

Windsor, Ont.
Alterations to jewelry store, cost $7,000, Ouellette avenue, for Howell Bros. and Knowlton. Architects, G. Jacques & Co. Brick and steel construction; New show cases and optical department will be added. Work being done by day labor .

Wininpeg, Man.
Foundry, cost $28,000, for Manitoba Bridge & Iron Works, Logan avenue. Architects and general contractors, J. McDiarmid Co., Canada Building, Winnipeg. Two storeys, 63 x 178, brick foundation and construction.

Publishing plant for The Tribune Publishing Co., 211 McDermot avenue. Architect and general contractor, J. D. Atchison, Trust and Loan Building. Portage avenue east. Three storeys, owner has to-day option of making it 6-storeys.

Residences

London, Ont.
Residence, cost $6,000, Waterloo St., for S. R. Mannes, 389½ Talbot street. Architect, W. G. Murray, Masonic Temple Building. 2½-storeys, 32 x 36, red brick construction, brick foundation. Plans in progress.

Montreal, Que.
Apartment house, Sherbrooke and Mountain streets, for Canadian Investment Co. Manager, Geoffrey Porteous, Transportation Building. Ten storeys, 120 x 100, structural steel and cut stone construction. Plans in progress.

Ottawa, Ont.
Two residences, cost $10,000, Sunnyside, for T. H. Brewer, 313 Riverdale. Architect, C. P. Meredith, 126 Sparks street. Brick veneer construction, cement foundation. Plans in progress.

Point Grey, B.C.
150 Residences, cost $8,500 each, for The Prudential Investment Co., Ltd., 300 Pender street west, Vancouver, planned to be erected in the 166 acre block to the south of 16th avenue and west of Shaughnessy Heights. Plans in progress.

Portage la Prairie, Man.
Apartments and stores for Wm Richardson. Three storeys, 66 x 132 Plans in progress.

St. John, N.B.
Two detached residences, cost $18,000, Orange and Princess, for Kenneth Haley, Leinster street, St. John, N.B. Architect, Garnet Wilson, Princess St. Tenders will be called shortly. Two storeys, 60 x 50, pressed and common brick and stone construction, brick and cement foundation.

Saskatoon, Sask.
Twenty-five residences, cost $4,500 each, for Seton Bens. Architects, Storey & Van Egmond, Regina, Sask., are preparing plans.

Toronto, Ont.
Residence and garage, cost $7,000, for Dr. F. Robertson, 1009 Bloor west. Architect, P. H. Finney, 79 Adelaide street east. 2½-storeys, 44 x 26, brick foundation and construction. Plans ready.

Vancouver, B.C.
Apartments, cost $50,000, south-east cor. Albert and Vernon Drive, for H. S. Rowling, 1506 11th avenue east. Five storeys, 50 x 77, brick and concrete construction. Separate tenders will be received by Architects, Stuart & White, 837 Hastings street west.

Whitby, Ont.
Residence and garage, cost $5,000, for R. Thompson. Architect, P. H. Finney, Adelaide street east, Toronto. Brick veneer construction. Plans drawn.

CONTRACTS AWARDED

Hamilton, Ont.
Residence, cost $10,000, Aberdeen avenue, for C. E. Goering, 173 Marland street. Architects, Watt & Blackwell, Lister Building. General contractor, H. C. Gummo, 15 Tuckett street. Subcontracts not yet let. 2½-storeys, brick construction.

Residence, cost $6,000, for N. S. Duffield, 160 Aberdeen avenue. Architects, Stewart & Witton, 2 Hughson street south. General contractor, Geo. E. Mills, 614 King street east. 2½-storeys, pressed brick construction, brick foundation, tile.

Montreal, Que.
Residence, cost $5,000, Verdun, Chateaubraind, for L. A. Lapointe, 2490 St. Hubert west. General contractors, P. Richer & Frere, 2607 St. Hubert. Two storeys, 50 x 50, cement foundation, brick construction.

Ottawa, Ont.
Residence, cost $12,000, Clemow Ave., for D. E. Johnston, Westminster Apartments. Architect, J. A. Ewart, 193 Sparks street. Mason, Chas. Holbrook & Sons, Lewis street. Carpenter, Cuthbertson & Clark. Painting, Higman & Sons, 176 Rideau. Plumbing and heating, J. R. McLennan, 240 Bank street. Electric work, E. G. Trissider, 58 5th avenue. 2½-storeys, brick veneer construction, stone foundation.

Quebec, Que.
Residence, cost $8,000, for Hon. S. N. Parent, 485 King Edward avenue, Ottawa. Architect and general contractor, V. Talbot, St. Valier and Bayard streets. Three storeys, 60 x 40, stone foundation, brick construction.

Toronto, Ont.
Residence, cost $5,000, for T. A. Welsh, 304 Queen street west. Architect, F. R. Berry, 1107 College street. Carpenter, S. R. Hughes, 79 Portland. 2½-storeys, stone and brick construction.

Westboro, Ont.
Residence, cost $6,000. [illegible] Builder and general contractor, W. J. Abra, 57 Elm, Ottawa. Brick veneer and stone construction, stone foundation.

Residence, cost $5,000. Owner and builder. J. R. Maimm, Hamilton Ave., Ottawa. Brick veneer construction, stone foundation.

Windsor, Ont.
Residence, cost $14,000, Victoria and Ann streets, for W. C. Kennedy. Architects, G. Jacques & Cole, 5 Sandwich street west. Excavation, Harry Cole. Mason, Geo. Sewell. Carpenter, Urgel Jacques. Painting and Glazing, T. W. Brooke & Son, 7 Pitt west. Plumbing and heating, Pennington & Briar, 47 Sandwich street west. Roofing, Tudei Celdona, Chicago, Ill. Iron work, T. J. Eansor Co., Windsor. Three storeys, 40 x 48, brick and stone construction, brick foundation.

Winnipeg, Man.
Seven residences, cost $21,000, Lifton. Architect and general contractor, J. Stoller, 562 Pritchard avenue. Two storeys, 20 x 28, stone foundation, frame construction.

Power Plants, Electricity and Telephones

Edmonton, Alta.
Extension of municipal telephone system, cost $848,260. Architect, A. Jeffers, City Architect. Engineer, A. J. Latornel. By-law passed February 24th. Work to start in spring.

Addition to power house, cost $485,000, planned by city council. Architect, A. Jeffers, City Architect. By-law passed February 24th, 1913, to provide additional power for extension to railway-tem.

Montreal, Que.
Telephone exchange, cost $100,000, St. Urbain street, for Bell Telephone Co., corner Notre Dame and St. John. Architect, W. J. Carmichael, corner Notre Dame and St. John, is preparing plans.

The city council has awarded contract for 175 arc lamps to Montreal Light, Heat & Power Co., Power Building, at a cost of $9,088. Superintendent of lighting, M. Parent, City Hall.

Prince Albert, Sask.
Telephone exchange. Prov. Govt. Dept. of Railways, Telegraphs and Telephones, will erect 3-storey brick building, on south side of 12th street east. Minister, Hon. J. A. Calder, Regina.

St. Thomas, Ont.
City of St. Thomas, Elec. Dept., Manager Caughell, plan to extend the present hydro system to the suburbs in the spring. General electric equipment needed.

West Hamilton, Ont.
Electric lighting system, for Ontario Hydro-Electric Power Commission. General contractor, Dundas Hydro-Electric System. Chairman of Local Commission, R. W. Karch, Dundas. Will require poles, insulators, 600 ft. steel guy wire, galvanized 1,200 carriage bolts, cross arms, lightning arresters, 22,800 ft. copper wire, 2-5 kw. transformers, power 1-5 kw. transformer, lighting, 3-10 kw. transformers, lighting, 7,300 lbs., copper wire for streets.

Wingham, Ont.
The Council contemplates the purchase of a new generator and additional electrical equipment, cost $7,000. Mayor, [illegible]. Town clerk, [illegible].

Winnipeg, Man.
Air compressor and motor. Secretary, M. Peterson. Engineer, H. N. Ruttan, [illegible] avenue. General contractors, The Canadian Ingersoll Rand Co., [illegible] Union Bank Building, at $2,316.75 for 1 air compressor and 1 motor. General contractors, The Canadian Fairbanks-Morse Co., [illegible] street, at [illegible] for 1 air compressor.

Tenders and For Sale Department

Town of Swift Current, Sask.

Tenders for Electrical Machinery

Sealed tenders, endorsed "Tenders for Electrical Machinery," and addressed to the Secretary Treasurer, Swift Current, Sask., will be received up to noon of the **31st of March, 1913**, for [illegible] y of one two hundred kw. and one [illegible] ed kw. alternating current generators, [illegible] ected to high speed vertical engines or turbines, complete with all accessories.

[illegible] specifications may be obtained from [illegible] ersigned.

A marked cheque for five per cent. of the amount of the tender must accompany each bid.

The lowest or any tender not necessarily [illegible]

GEO. D. MacKIE, Town Engineer.

CITY OF SASKATOON

Tenders for Pavements

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Pavement," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of approximately 42,000 square yards of pavement, and 12,800 lineal feet of Concrete Gutter.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask., February 21st, 1913.
9-10-11-12

Tenders for Supplies

Sealed tenders, registered and clearly marked on the outside of envelope, "Tenders for Electrical Department Supplies," and addressed to the City Commissioners, Regina, Saskatchewan, will be received up until noon of **March 29th, 1913**, for the supply of:—

Section No. 1.—Weatherproof copper wire.
Section No. 2.—Western cedar poles.
Section No. 3.—Cross-arms.
Section No. 4.—Top-pins, insulators, etc.
Section No. 5.—Pole line hardware.
Section No. 6.—Pole type transformers.
Section No. 7.—Integrating watt meters, single, polyphase and two rate.

Section No. 8.—Metal flame arc lamps and station equipment.

Section No. 9.—Series cut-out mast arms for arc lights.

Section No. 10.—Underground material.
Section No. 11.—Fire alarm boxes and gongs.
Price to be F.O.B. Regina.

Copies of specifications may be had from E. W. Bull, Superintendent of Light and Power, Re- [illegible]

A marked cheque covering 5 p.c. (five per cent.) of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
9-10-11-12-13 Supt. of Light & Power.

CITY OF SASKATOON

Tenders for Labor on Storm Sewers

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Labor on Storm Sewers," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the laying of approximately 6,525 lineal feet of Storm Sewer; 2,100 lineal feet of Catch Basin Connections, and the construction of Manholes, Catchbasins and Appurtenances.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

Tenders Wanted

Public School Board

Edmonton

Sealed tenders will be received by the undersigned up to **Thursday, March 20th, 1913**, for the erection of a sixteen room brick school on Block Seven, Hudson Bay Reserve.

Tenders must be accompanied by a certified cheque for five per cent. of tender.

Plans and specifications may be obtained at the Public School Board, Edmonton, Alta.

The lowest or any tender not necessarily accepted.

Edmonton Public School Board,
10-11 Edmonton, Alta.

CITY OF SASKATOON

Tenders for Concrete Sidewalks

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Concrete Sidewalks," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of approximately:—

265,390 square feet of Concrete Walk.
5,700 square feet of Lane Crossings.
28,760 lineal feet of Separate Curb.
22,050 lineal feet of Combined Curb.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

Tenders Wanted

Sealed tenders, marked on envelope "Tender for School Building," and addressed to the undersigned, will be received up to **Wednesday, March 19th**, at six o'clock p.m., for the erection of an addition to the Woodstock Collegiate Institute.

Plans, specifications and any other information required may be had at the office of the architect. The lowest or any tender not necessarily accepted.

B. McNICHOL, Architect.
Woodstock, Ont.
March 1st, 1913. 10-11

City of Moose Jaw, Sask.

TENDERS FOR

Boiler Room Equipment

Sealed tenders, marked "Tenders for Boiler Room Equipment," addressed to the City Commissioners, Moose Jaw, Sask., will be received up till 12 o'clock noon on **Wednesday, March 26th, 1913**, for the following:—

One fuel economizer with 7,000 sq. ft. heating surface.

One induced draft plant to handle 120,000 cu. ft. of gases per minute.

Each tender must be accompanied by a marked cheque or cash deposit equal to at least five per cent. of the amount of tender.

Plans and specifications may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw, Sask.

The lowest or any tender not necessarily accepted.

JAMES PASCOE,
L. W. RUNDLETT,
W. F. HEAL, City Commissioners.
Moose Jaw, Feb. 25, 1913. 10-12

HALIFAX, N. S.

Water Works

Sealed tenders addressed to the Mayor for the construction of a Reinforced Concrete Reservoir and Gate House will be received at the office of the Committee on Works of the City of Halifax, N.S., until noon on **Wednesday, April 2, 1913.**

Each tender must be accompanied by a properly certified cheque for the sum of one thousand dollars, payable to the order of the City Treasurer of the City of Halifax, said cheque to be returned to the bidder unless he fails to execute the contract should it be awarded to him, within ten days of such award.

A bond in the sum of ten thousand dollars with two approved sureties or with an approved Surety Company as surety, will be required for the faithful performance of the contract.

Notice to contractors, form of tender, contract, specifications and bond can be obtained, and plans can be seen at the office of the City Engineer.

The City reserves the right to reject any or all tenders should it deem it advisable to do so, and reserves the right to award the contract as it deems best.

By order,
J. J. HOPEWELL,
10-12 Clerk of Works

Belleville New Public School

Architects are invited to submit sketch plans for a new Public School with 11 rooms; Principal, Teachers and Assembly rooms; complete building, ventilating and lighting system; proposed building not to exceed $50,000. If any plan accepted the architect to receive five per cent. of actual cost in full of all services, including plans, specifications, oversight of work and expenses. The Board reserves to itself the right not to accept any plan submitted. Sketch plans to be in on or before March 29th instant.

W. JEFFERS DIAMOND,
11 Secretary-Treasurer.

Tenders Wanted

Tenders will be received by the undersigned up till noon on **Tuesday, March 25th, 1913**, for:—

One Generator for Incandescent Lighting for a 260 horse power engine. Tenders to furnish all information as to construction, dimensions, service and guarantee, and price to include free delivery at the Light Plant of the City.

100 to 125 ornamental cast iron poles, 13 ft. 6 in. high, 5-light cluster (1 upright and 4 pendant) 6-in. standard globe holders; suitable for underground wiring system. Price F. O. B. Windsor.

Tenders for Generator and Poles to be made separately. No tender in either case necessarily accepted.

STEPHEN LUSTED, Clerk.
Windsor, Ont., March 6, 1913. 11-12

Department of Railways and Canals

Car Ferry Terminal

CARLETON POINT

Prince Edward Island

Sealed tenders addressed to the undersigned and marked "Tender for Car Ferry Terminal, Carleton Point," will be received at this office until 16 o'clock on **Tuesday, March 25th, 1913.**

Plans, specifications and form of contract to be entered into can be seen on or after February 20th, at the Office of the Chief Engineer of the Department of Railways and Canals, Ottawa, at the office of the Chief Engineer of the Intercolonial Railway at Moncton, N.B., and at the office of Horace McEwen, Superintendent of the Prince Edward Island Railway, Charlottetown, P.E.I.

Parties tendering will be required to accept the fair wages schedule prepared or to be prepared by the Department of Labour, which schedule will form part of the contract.

Contractors are requested to bear in mind that tenders will not be considered unless made strictly in accordance with the printed forms, and in the case of firms, unless there are attached the actual signature, the nature of the occupation, and place of residence of each member of the firm.

An accepted bank cheque for the sum of $50,000 made payable to the order of the Minister of Railways and Canals, must accompany each tender, which sum will be forfeited if the party tendering decline entering into contract for the work, at the rates stated in the offer submitted.

The cheque thus sent in will be returned to the respective contractors whose tenders are not accepted.

The cheque of the successful tenderer will be held as security, or part security, for the due fulfilment of the contract to be entered into.

The lowest or any tender not necessarily accepted.

By order,

L. K. JONES,
Asst. Deputy Minister and [illegible]

Department of Railways and Canals,
Ottawa, 18 February, 1913.

Newspapers inserting this advertisement without authority from the Department will not be paid for it.—36655 11-12

COUNTY OF CARLETON

Tenders Wanted

Sealed tenders addressed to Chas. Macnab, County Clerk, Ottawa, and marked "Tender for Drum Bridge," will be received up to 12 o'clock noon, **Tuesday, April 1st, 1913**, for the construction of a bridge between Counties of Carleton and Lanark opposite Lot 30 in first Concession Marlboro. Plans and specifications can be seen in County Clerk's office Ottawa, and at Mr. Pattie's office, Carleton Place.

CHAS. MACNAB,
County Clerk.

Ottawa, Ont.,
March 4, 1913. 11-12

The Regina Public School Board

Tenders, sealed and endorsed on envelope "Tenders for School Building, Block 53, Broder's Annex, Regina," will be received by the undersigned up to 12 o'clock noon, **Thursday, March 20th, 1913**, for work and material in all trades (except plumbing, heating and ventilating) required in the erection and completion of a Public School Building.

Each tender must be accompanied by a marked cheque for five per cent. of the amount of the tender made payable to the Chairman of the Public School Board, the successful tenderer to have this cheque returned upon furnishing satisfactory bond for ten per cent. of the amount of the contract, conditional for the due and proper performance of the work. The deposit of the unsuccessful tenderers will be returned when the contract is signed.

The right to reject any or all tenders or to waive any defects or irregularities therein, is to be at the discretion of the Board.

Plans, specifications, form of tender and all information may be obtained on application to the undersigned.

J. H. PUNTIN, Architect.
308 Darke Bldg., Regina, Sask.
March 1st, 1913. 11-12

CITY OF PORT ARTHUR

NOTICE

Sealed tenders, endorsed on the envelope "Tenders for Railway Material," will be received by the undersigned up to 5 o'clock p.m. of **Monday, March 31st, 1913**, for the supply of the following Railway Material to be delivered F. O. B. cars Port Arthur, via Boat and Rail, before May 20th.

Tender A.
No. 2/0 Round Trolley Wire, 8 tons.
No. 4/0 Flexible Feeder Wire, D. B. W. P., 6¼ tons.

Tender B.
24,200 ft. 80-lb. 5-in. Tee Rails.
50,000 ft. 60-lb. 5-in. Tee Rails.
[illegible]
840 pair Angle Bars, 80-lb. Rail, 4 hole
[illegible]
[illegible]
[illegible]

Tender C.
Steel Intersections, Frogs, Switches, etc.

[illegible] from the City Engineer and the undersigned.

[illegible] each tender.

[illegible]

J. J. HACKNEY,
Commissioner Utilities.
[illegible]
March 5th, 1913. 11-13

TENDERS

Sealed tenders addressed to W. J. McCaffrey, Indian Agent, Maniwaki, Quebec, will be received up to noon, **Saturday, April 5, 1913**, for the construction of concrete abutments for a bridge over Conger Creek in the Maniwaki Indian Reserve, County of Wright, Quebec.

Plans may be seen at the office of the said agent or at the Department of Indian Affairs, Ottawa.

The lowest or any tender not necessarily accepted.

The unauthorized insertion of this advertisement in any newspaper will not be paid for.

J. D. McLEAN,
Assistant Deputy and Secretary.
Department of Indian Affairs,
—37677 Ottawa, March 3, 1913 11-1[illegible]

Tenders for Power House Equipment

Sealed tenders, registered and clearly marked on the outside of the envelope "Tender for Power House Equipment," and addressed to the City Commissioners at Regina, Sask., will be received up until noon of **April 30th** for the supply of:—

1 1200 kw. synchronous motor generator or motor converter set, complete with panel for the control of A.C. motor and generator panel, and equalizing pedestal for the control of D.C. generator.

Specifications may be had upon application to Mr. E. W. Bull, Superintendent of Light and Power, Regina, Sask.

A marked cheque for five (5 p.c.) per cent. of the amount of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
11-15 Superintendent of Light and Power.

Tenders for Concrete Piers, Abutments and Floors

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, April 1st, 1913** [illegible] Abutments and Floor for St. Clair Avenue Bridge [illegible]

[illegible] Toronto.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]
March [illegible], 1913 11

Tenders For

Overhead and Pole Line Material

[illegible] registered post only, addressed to the Chairman of the Board [illegible] City Hall, Toronto, Canada, up to [illegible] Tuesday, April 1st, 1913, for Trolley [illegible] Hangers, Pullovers, Sleeves, Ears, Frogs, Bolts, Bands, Etc.

Specification and tender form may be obtained upon application at the office of the Purchasing Section, Department of Works, City Hall, To[illegible]

Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering as [illegible] by city by-law must be strictly com[illegible] or the tenders may be declared in[illegible]

Tenderers shall submit with their tenders the names of two personal sureties approved by the City Treasurer, or in lieu thereof, the bond of a guarantee company approved as aforesaid.

The lowest or any tender not necessarily [illegible]

H. C. HOCKEN, Mayor,
Chairman, Board of Control.
City Hall, Toronto,
March 5th, 1913. 11

Notice to Contractors

Tenders for Sewers

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on Tuesday, March 18th, 1913, for the construction of sewers on the following streets:—

Derby Lane, from 120 feet east of Parliament street to Erin lane.

Erin lane, from Derby lane to Front street.

Clinton place, from Clinton street to 269 ft. W.

Lane first north Phoebe street, from Huron street to 300 feet west.

Hazelwood avenue, from 493 feet east Pape avenue to 133 feet further east.

Carlaw avenue, storm sewer No. 4, on Queen street, from Carlaw to Pape avenue.

Queen street, from 285 feet east of Hammersmith avenue to Kingswood road.

Specifications and tender forms may be obtained upon application at the office of the Sewer Branch, Department of Works, City Hall, Toronto. Envelopes containing tenders must be plainly marked on the outside as to contents.

The usual conditions relating to tendering, as prescribed by city by-law, must be strictly complied with or the tenders will be declared informal. Tenderers shall submit with their tenders the names of two personal sureties approved by the City Treasurer, or in lieu thereof, the bond of a Guarantee Company approved of as aforesaid.

The lowest or any tender not necessarily accepted.

H. C. HOCKEN, Mayor,
Chairman, Board of Control.
City Hall, Toronto,
March 5th, 1913. 11

To Contractors

Sealed tenders to be marked "Tender for Hospital," addressed to the undersigned, will be received at this Department until noon on **Saturday, March 22nd,** for all works (excepting heating, plumbing and wiring) required in the construction of a Reception Hospital to be erected on the grounds of the Hospital for Insane, Brockville. Plans and specifications can be seen at this Department and the above Institution.

An accepted bank cheque payable to the order of the Honorable J. O. Reaume, Minister of Public Works, for five per cent. of the amount of the tender and the bona fide signatures and addresses of two sureties or the bond of a Guarantee Company approved by this Department, must accompany each tender.

The Department will not be bound to accept the lowest or any bid.

By order,
H. F. McNAUGHTEN,
Secretary, Public Works Department.
Department Public Works, Ontario,
Toronto, March 6th, 1913.

Newspapers publishing this advertisement without authority will not be paid for it. 11

CITY OF LONDON, ONT.

Tenders For

Highway Bridge

Over the River Thames

Sealed proposals addressed to the "Chairman and Members of No. 2 Committee," will be received at the Office of the City Clerk until 5 p.m. on **Thursday, April 10th, 1913**, for the following work:—

(a) Construction of concrete piers and abutments.

(b) Erection of Three 130 foot span riveted steel trusses.

(c) Construction of reinforced concrete flooring.

Each bidder shall make his tender on the form furnished by the City Engineer.

Plans and specifications and form of tender may be seen at and obtained from the office of the City Engineer.

Contractors to enclose a marked cheque for ten per cent. (10 p.c.) of the amount of their bid.

The City reserves the right to reject any or all bids and to accept any bid.

B. W. BENNETT,
Chairman No. 2 Committee.
H. A. BRAZIER,
11-13 City Engineer,

For Sale

Dredge and Derrick and Tug, Portable Crusher, and 20 horse power Boiler and Engine, 12-ton Case Roller, "steam steerer," 19 Dump Waggons, Wheel and Drag Scrapers, Shovels, Hammers and Picks. All in good working order and cheap. Apply to H. A. Camjaigne, Niagara House, Niagara Falls, Ont. 10-T.F.

McMyler Derricks For Sale

Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover buckets, two (2) marine engines, boilers, fuel lighter with whirley aboard. Address

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

C

Wanted

One good second-hand stone crusher, complete; in good working order. Address Box 655, Belleville, Ont. 10-T.F.

Partner Wanted

Experienced Toronto architect (age 30), with three years private practice and good clientele, desires partner. Would accept position with view to partnership. Box 735, Contract Record, Toronto, Ont. 11

Concrete Block Proposition

Parties operating extensive pits of best sand and gravel wish to engage a man with plant to manufacture Concrete Blocks, Bricks or Sand Lime Bricks. Good location, Niagara Peninsula. Plenty of water; cheap electric power; railway sidings; close to several cities. Liberal proposition. Write now to Box 739 Contract Record, Toronto, Ont. 11-12

Situations Vacant

WANTED—First class architectural draughtsman and designer. Position permanent with view to partnership. Apply to Box 229, North Bay, Ont. 11

WANTED.—A good all round architectural draughtsman, good salary and permanent position. Communicate at once with H. C. McBride, Architect, London, Ont. 11-12

WANTED—Superintendent for construction work, tracklaying, ballasting, etc. Must be first-class man with unexceptional references. Address Box 720, Contract Record, Toronto, Ont. 9-11

Situations Wanted

Young man, University graduate, with several years' experience, would like position with reliable firm of architects. Apply Box 736, Contract Record, Toronto, Ont. 11-14

Applications wanted for position of walking boss, concrete work; concrete and carpenter foremen; cost clerks; fifty good form carpenters wanted. Applications must give detailed experience, references, recommendations, etc. Long time job and best pay. Apply A. M. Crain, Box 193, Bassano, Alta. 9-11

Contractor's Diver disengaged; requires situation. Have good references. Accustomed to all kinds of pier work, intake and outfall. J. Sweeney, 157 La Salle Avenue, Maisonneuve, P.Q. 9-11

Young engineer (27) wishes position representing good contracting, mining or industrial company in West Indies or Mexico. Two years experience in Mexico. Best of references. Box 713, Contract Record, Toronto, Ont. 8-11

New Companies

McDonald & Willson, Limited, have been incorporated with a capital of $150,000, to carry on business as manufacturers and general contractors, with head office at Toronto. The provisional directors are C. S. McDonald, C. H. Willson, merchants, and W. K. Lindsay, accountant, all of Toronto.

The Lake City Realty Company, Limited, has been incorporated with a capital of $100,000, to erect buildings and deal in all kinds of building material, with head office at Fort William. The provisional directors are Jos. Enzer, J. W. Newcombe, merchants, and F. A. Blatchford, dentist, all of Fort William.

Ritz-Carlton Hotel, Montreal, Canada
Warren & Wetmore, Architects, George A. Fuller Co., Builders

A notable example of a superior grade of

Architectural Terra Cotta

Terra Cotta has been employed on all fronts, in combination with limestone, which it exactly matches in color. The modelling executed in our shops is of a very high order, and is thrown in high relief by the application of a bluish gray back-ground throughout the ornamental features in the upper part of the building.

This Terra Cotta has received the highest Commendation from Architects and Builders.

Federal Terra Cotta Co.

Factory, Woodbridge, New Jersey 111 Broadway (Trinity Bldg.) New York Monadnock Bldg., Chicago

Sales Representatives in all the Principal Cities in Canada

RAILWAY CONSTRUCTION PLANT

Hoisting Engines, Horse Powers, Hand Winches, Derricks, Car Wheels, Axles and Boxes, Dump Cars, Rail Cars, Buckets

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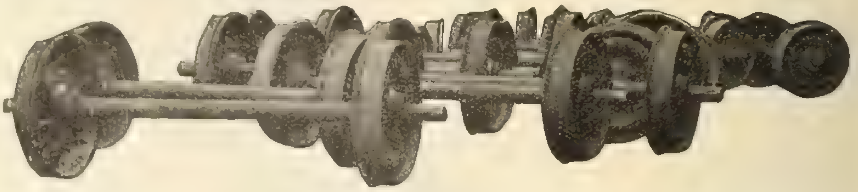

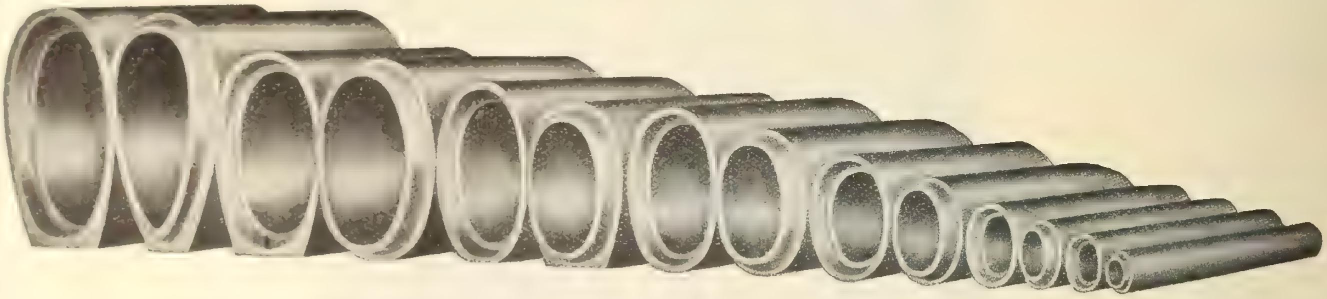

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properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

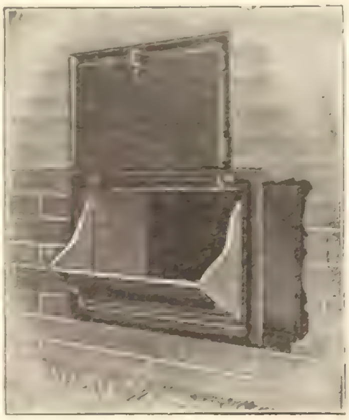
STANDARD REINFORCEMENT, or SPECIAL if required. **Stock sizes 6 in. to 60 in.**

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario



EQUIP YOUR CELLAR

with one of our "Majestic" Coal Chutes which is the neatest and best equipment for any cellar. It is easily installed in either new or old houses. It permits coal, wood or vegetables to be put into the cellar without disfiguring the building in any way. And unlike a glass window it cannot be broken. The hopper can easily be removed if desired to put in very coarse coal or wood, or if a waggon chute is used. It swings back into the chute and allows the door to be closed. The door is made to lock when opened upward, and protects the wall or siding above the chute, and can be released only when closed. We make three standard sizes. There's a size that's just right for your cellar and your requirements. No. 1—22 x 16 x 13. No. 2—27 x 16 x 13. No. 3—33 x 22 x 18.

Send for our illustrated booklet, it shows and describes our full line of Coal Chutes

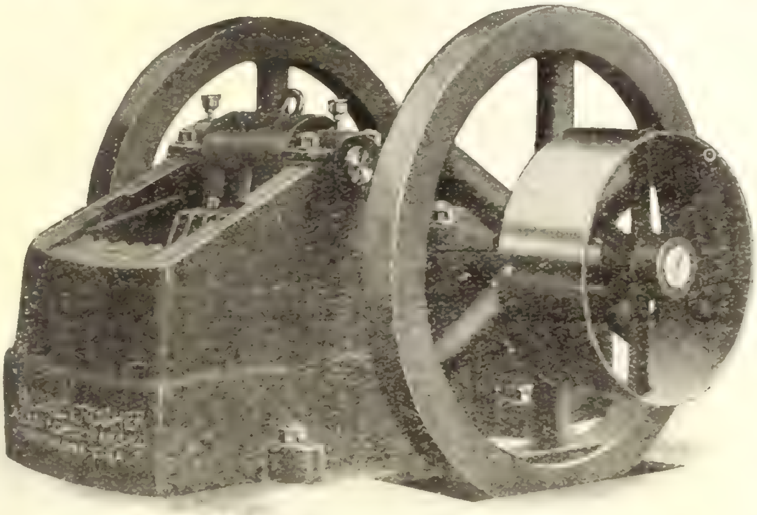
The Galt Stove & Furnace Co., Limited

Galt, Ontario, Can.

Montreal Representative: E. F. Dartnell, No. 8 Beaver Hall Square
Gorman, Clancey & Grindley, Agents, Calgary and Edmonton, Alberta

Improved "Blake" Crusher

No.	Receiving Capacity	Approximate Horse Power	Weight Complete
2	10 x 7	7	6,500
3	15 x 9	10	12,000
4	20 x 10	15	15,000
5	24 x 12	25	47,000
6	30 x 18	40	47,000
7	36 x 24	60	80,000



See Bulletin No. 1802

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'Tis Air That Cleans

TUEC Stationary Cleaners.

The TUEC is more than a Good Cleaner–it is a PERFECT Cleaner

TUEC

STATIONARY AIR CLEANING SYSTEM

Canadian Tuec Distributors:

Tuec Co. of Winnipeg, 419 Portage Ave., Winnipeg, Man.
Tuec Co. of Calgary, 812 First Street W., Calgary, Alta.
James J. Martindale, 112 Mail Building, Toronto, Ont.
Tuec Co. of Montreal, 406 New Birks Bldg., Montreal, Que.

Send for Cat. A

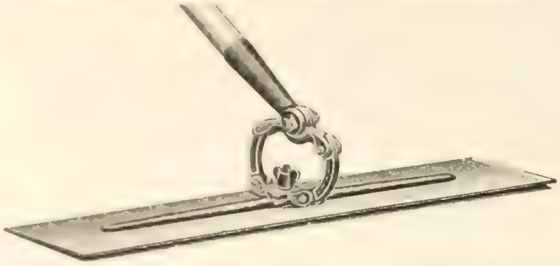
Argenteuil Granite Co., Limited

42 Craig Street West, MONTREAL

We are in the market to bid on your plans for granite on buildings.

Our up-to-date cutting plant, excellent quarries and good shipping facilities enable us to make close prices.

SEND US BUILDING PLANS TO-DAY



24 INCH ABRAM TROWEL

Abram Sidewalk Finishing Tools are the original **Automatic "Wrist Motion" Tools,** and the only Sidewalk tools made having this **"Wrist Motion"** and long handles. Every Set of **"Abram"** Tools is sold on the Guarantee that **ONE MAN** can do more work with them than **THREE MEN** can with old style tools. Write to-day for circular.

ABRAM CEMENT TOOL CO. 105 Ouellette Ave,
WINDSOR, ONT.

Vault Doors and Safes

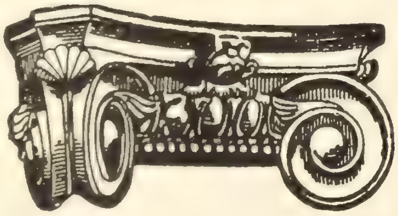
J. & J. Taylor

Toronto Safe Works

Established 1855 **TORONTO**

Branches: Vancouver and Winnipeg
Montreal.

Our Patent Wainscot Cement



Centre Pieces, Brackets, Veranda Capitals and Freizes. Claphams Grey Wainscoat Cement Finish for Bathrooms, Kitchens, Lavatories, etc.

JOHN CLAPHAM & SON

69 Hughson St., N., HAMILTON

H. LONGHURST F. E. COOPER J. V. CUTTRISS

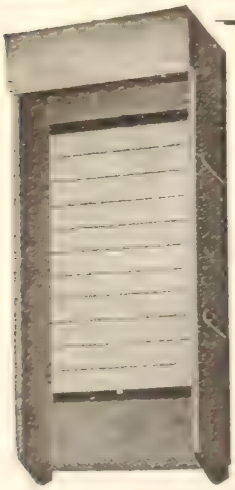
Hamilton Art Glass Co.

143½ King St. East, Hamilton, Ont.
Telephone 3537

Glass of all kinds and Patterns for Dwellings, Stores, Offices, Public Buildings and Churches.

Church and Domestic Art Glass
in Lead, Electroglazed and Copper Bar

Ornamental Chipped and Sand Cut Glass. Bevelled Plate and Mirrors. Plate and Window Glass



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SAND and GRAVEL SCREENS

We make **SCREENS** for all purposes

Concrete Reinforcement, Window Guards, General Wire and Ironwork.

Shall be pleased to quote you.

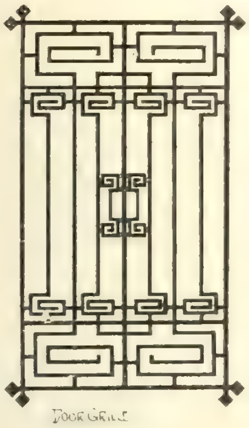
Canada Wire & Iron Goods Co.
Hamilton

Tenders

A few dollars spent in advertising your proposals in the

Contract Record
and Engineering Review

would result in additional competition, which might save your city or town or your client many hundreds of dollars.



Window and Door Grilles

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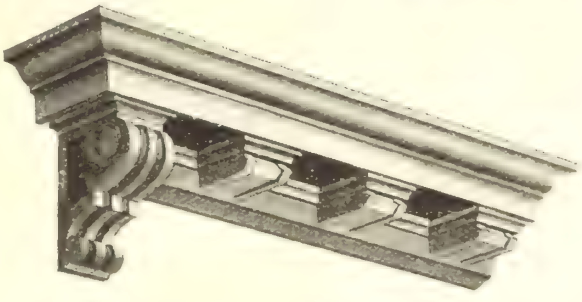

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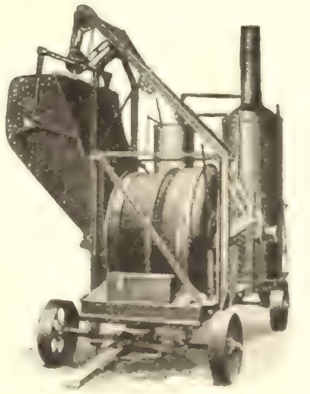

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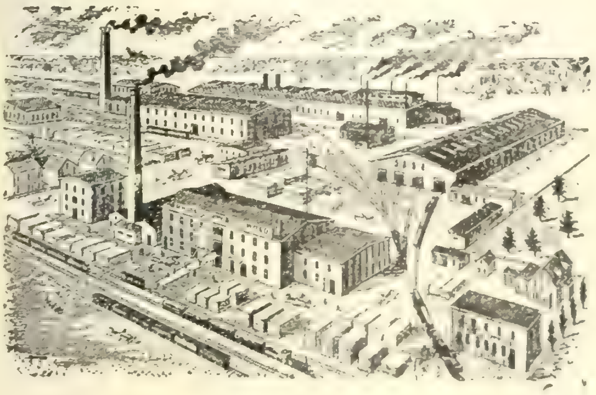

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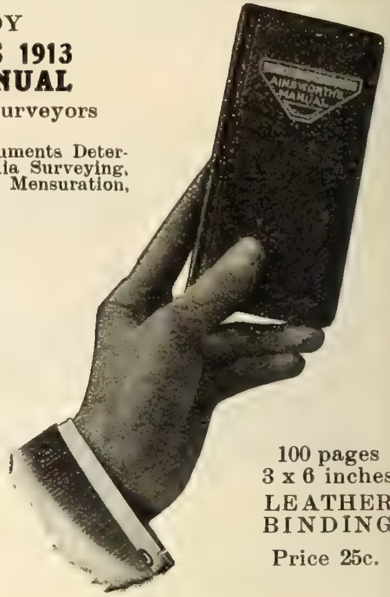

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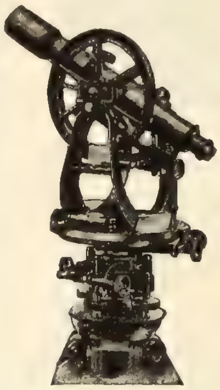

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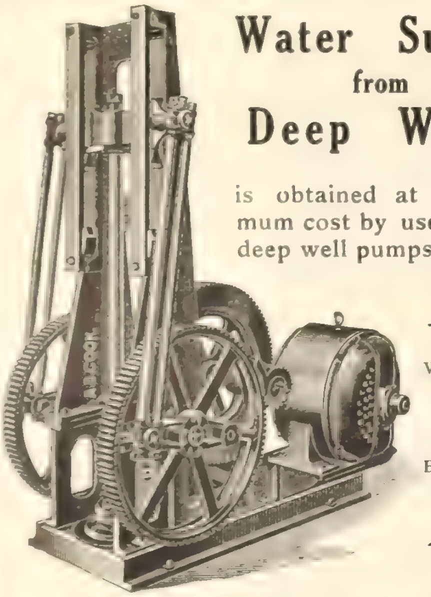

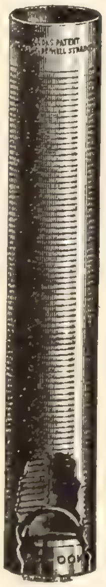

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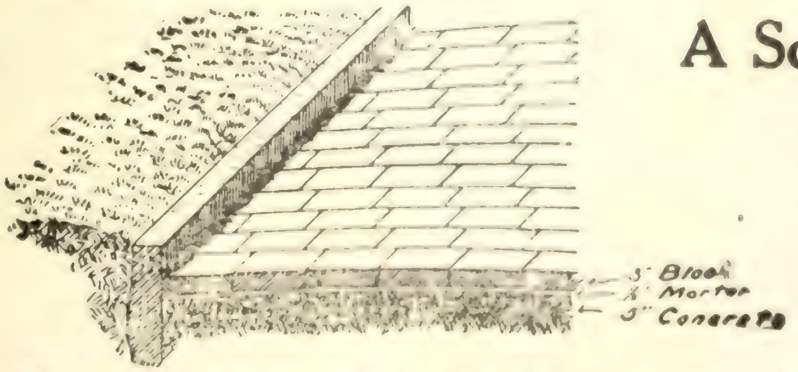

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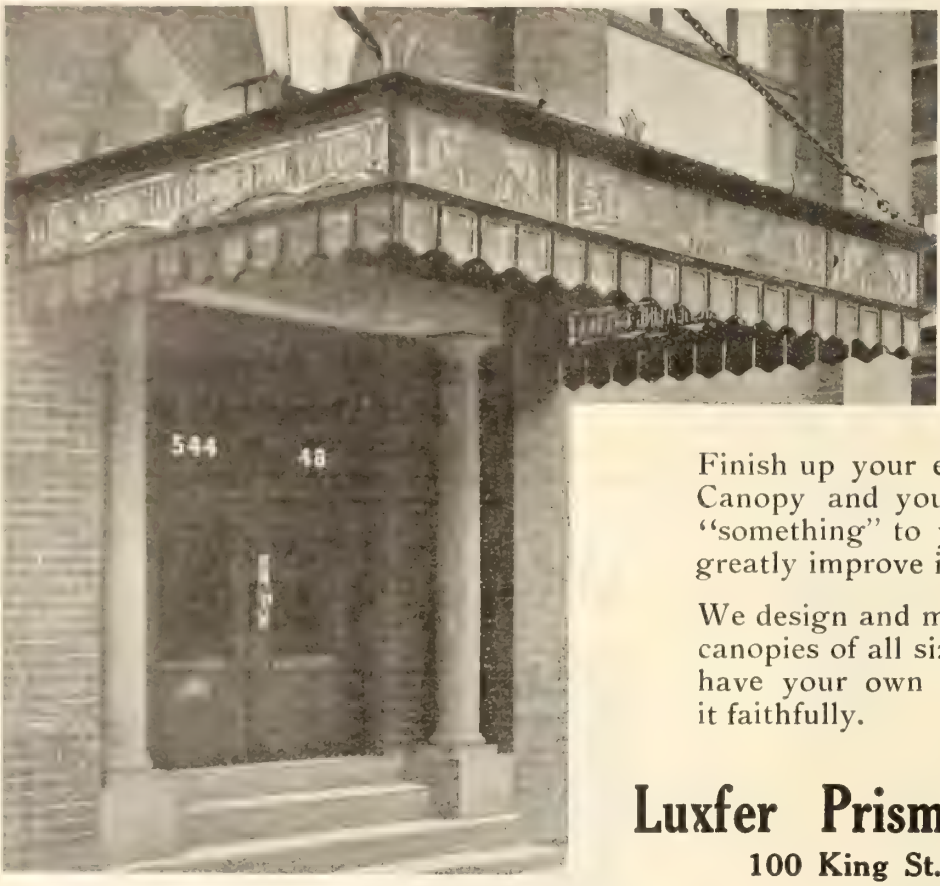

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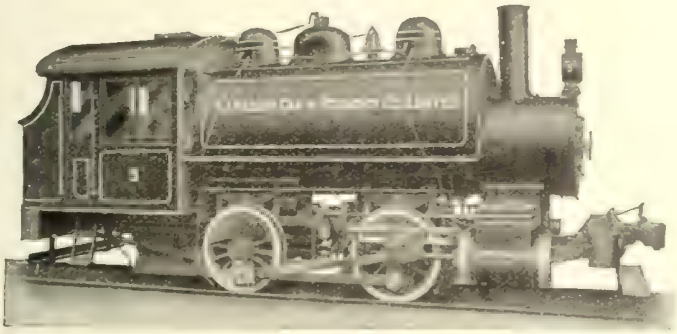

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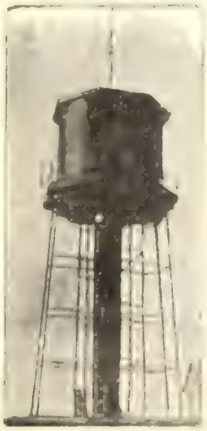

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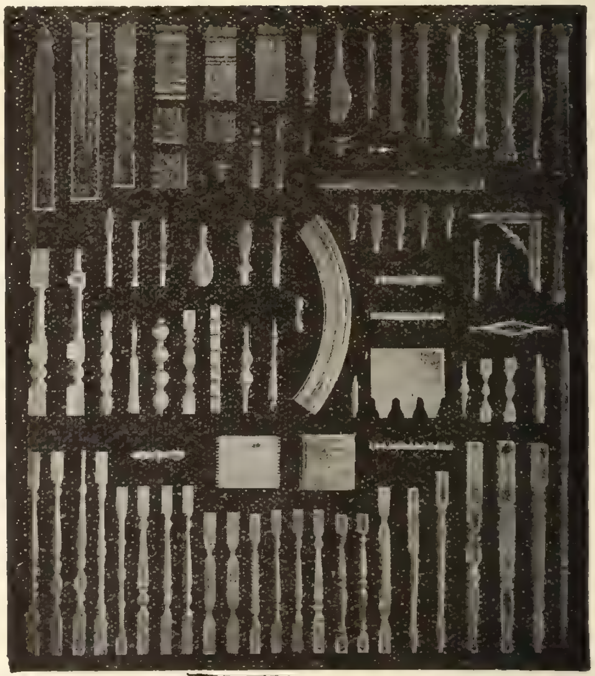

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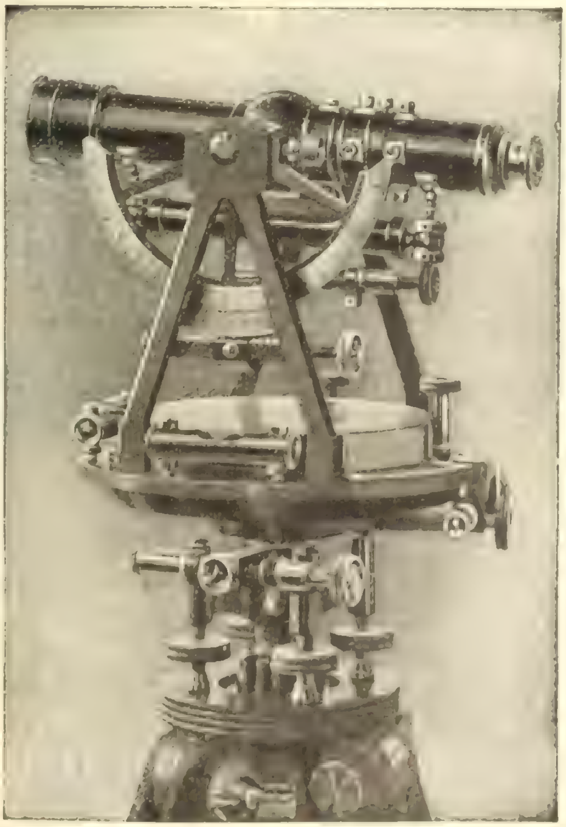

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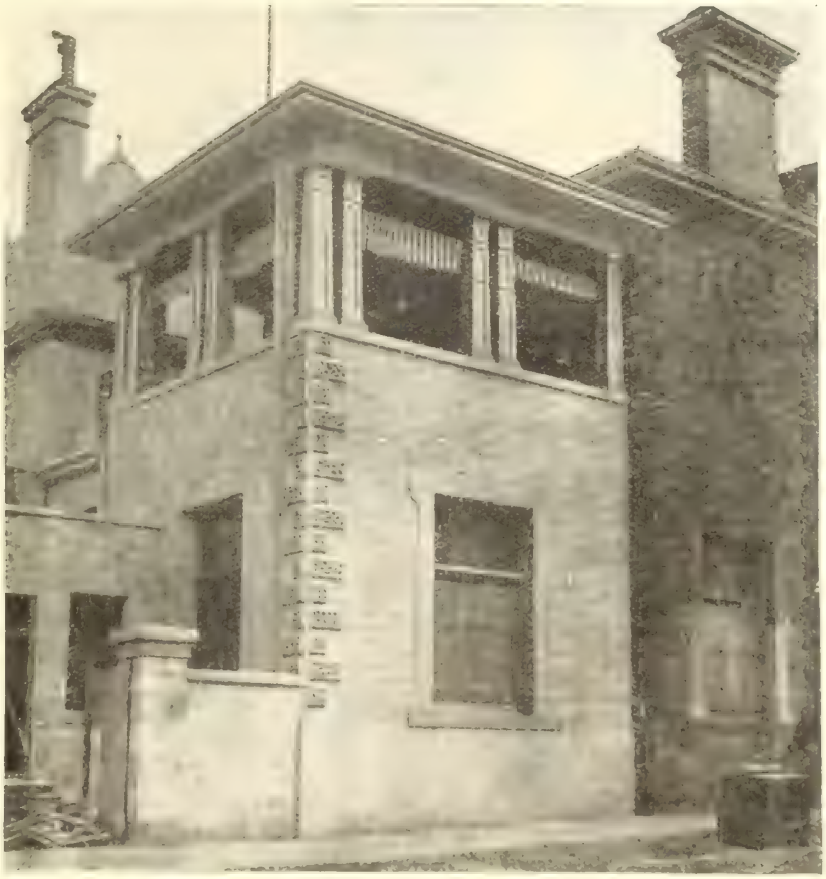

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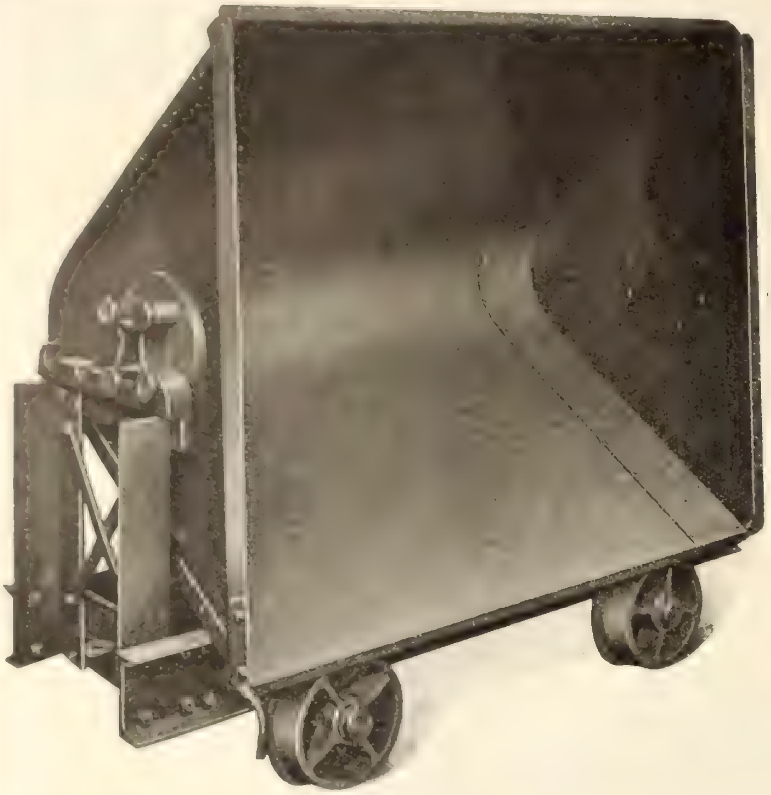

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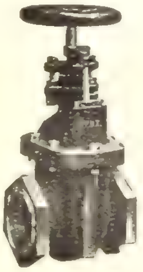

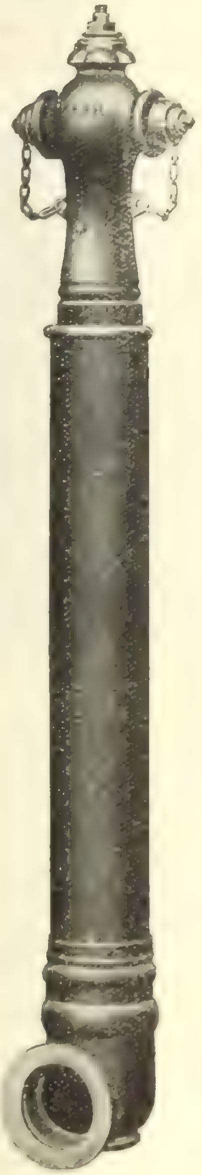

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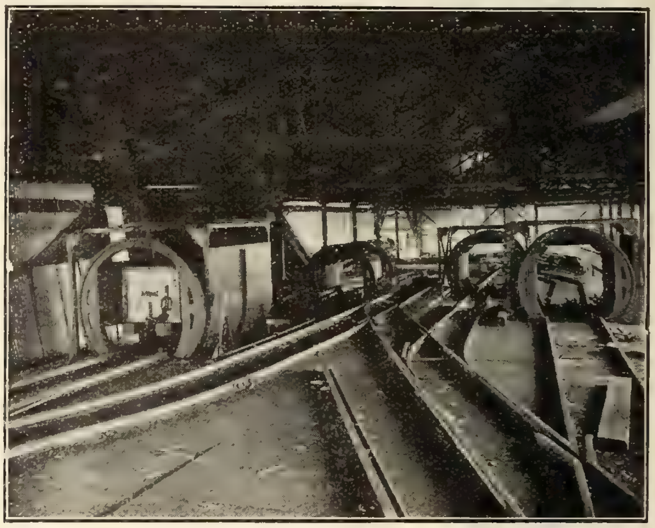

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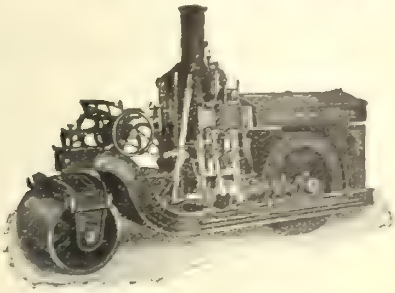

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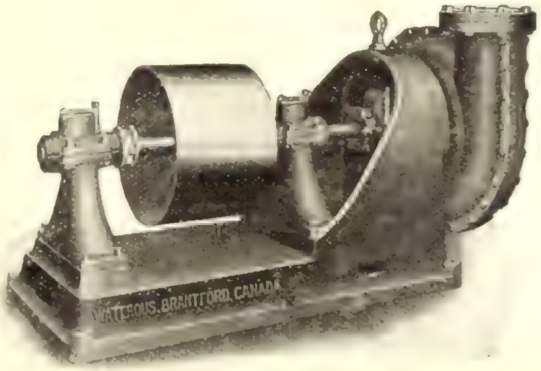

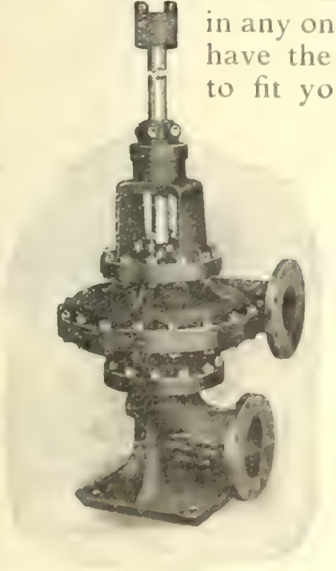

Waterous Trouble-proof Centrifugal Pumps

Can Be Used In Every Service

They are built in Vertical and Horizontal types, in sizes from 4 in. to 14 in. discharge opening, and can be used with belt engine or motor drive. They are extremely simple, for a given capacity take a minimum space and are built of selected materials to be practically unbreakable.

We guarantee these pumps for material and workmanship.

Description in Bulletin No. 200

The Waterous Engine Works Co., Ltd.

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They have been the standard for more than twenty-five years. Their colors are soft, rich and beautiful and guaranteed fast. They are made of Creosote, which thoroughly preserves the wood, and they contain no [illegible] or other [illegible]. Accept no substitution of unknown stains, because you are sure of Cabot's.

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Cabot's Quilt, Waterproof Cement and Brick [illegible]
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of all designs in both iron and steel; Roofs, Telephone Poles, House Girders and all kinds of Structural Iron Work.

Our stock in hand comprises Steel Beams, Angles, Tees, Channels, Plates, Rolled Edged Flats, Bars, Rivets, Rounds, &c.; Iron Beams, Bars, Squares, Turnbuckles, Rivets, &c.

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Works at Lachine Locks, P.Q., Toronto, Ottawa and Winnipeg

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Locomotive Turn Tables and Structural Steel and Iron Work of all descriptions. Estimates furnished on application.

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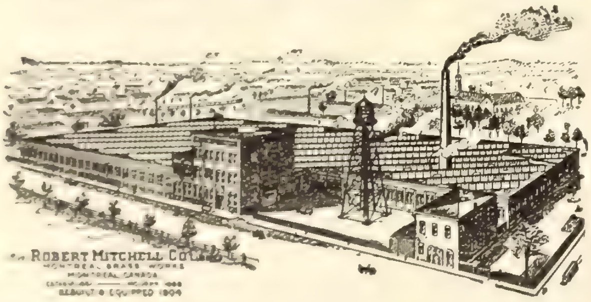

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Structural Steel for Quick Delivery

We carry in stock at Montreal, 5,000 tons of Structural Shapes and are in a position to make quick shipment of either plain or riveted material for

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Designers, Fabricators and Erectors of Structural Steelwork for Bridges and Buildings of every description.

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Frost-Proof
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WOODEN WATER PIPE

For water works systems, domestic water supply and hydraulic mining. Insulated wire conduits; steam pipe casings; acid-proof pipe for mines, tanneries and pulp mills. Sizes from 2 inches to 24 inches.

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Capacity 9000 tons per annum.

Shop is equipped with High Speed Electric Cranes and Modern Heavy Duty Tools, Can handle single pieces structural work of 40 tons.

Large Stock of Beams, Channels, Angles, Tees, Plates, etc., for prompt shipment.

Stock yard runway 800-ft. long, crane 70-ft. span.

Shipping runway 400-feet long, crane 80-ft. span.

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Water Washed Sand
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Manufacturers

Flexible and Flange Pipe, Special Castings and all kinds of Waterworks Supplies.

CAST IRON PIPE

3 inches to 60 inches diameter

for Water, Gas, Culvert and Sewer

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Iron Ore, Pig Iron, Car Wheels, Cast Iron Water and Gas Pipe, Specials, Valves, Hydrants, etc., Castings of all kinds, Mooring Bollards for both Concrete and Wooden Docks, Hoisting Machinery.

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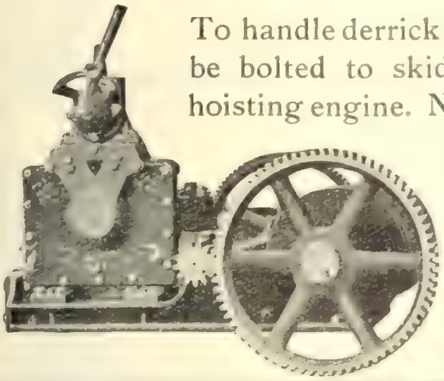

To handle derrick booms. Can be bolted to skids in front of hoisting engine. No dead center.

Start, Stop, Reverse at Will

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Lays Cheaper
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Write for prices—any quantity—prompt delivery.

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Lake or Rail Shipments
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Free Inspection of Gas Piping Installations in Toronto

If you want to be sure that your men or your gas fitters are installing the proper sizes of gas pipes in any of your new buildings in Toronto let us know.

If you are an architect, a builder, or a contractor you will want good service rendered to your clients. An adequate gas supply is the remedy. To get good service,—pipes must be of sizes suitable to the building.

Our specifications give you the sizes necessary for good service. Some builders absolutely refuse to install piping of proper sizes, claiming that it is **some game of the Gas Company.** It is these same builders, and some others, that have forced us to expose the conditions as we find them. Poor pressure in many new Toronto homes and buildings is caused through the installation of too small gas piping, and we take this means of warning everyone against the practice.

Every person that wishes to have proper size pipes, can make sure what the pipe fitters are installing by notifying our Building Inspection Department. No charge is made for this service.

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Practical House Framing, by Albert Fair. Published in 1909 by Industrial Book Company, New York. 108 pages, illustrated. Price 50c.

Hints for Carpenters, by Albert Fair. Published in 1909 by the Industrial Book Company, New York. 144 pages, illustrated. Price 50c.

Modern Plumbing, illustrated, by R. M. Starbuck. Published in 1907 by Norman W. Henley Publishing Company, New York. 329 pages, illustrated. Price $2.00.

Reinforced Concrete, by A. W. Buel. Published in 1906 by the Engineering News Publishing Company, New York. 500 pages, illustrated. Price $1.00.

The Sanitation of a Country House, by Dr. Harvey A. Bashore. Published in 1905 by John Wiley & Sons, New York. 98 pages, illustrated. Price 50c.

Modern Practical Carpentry, by George Ellis. Published in 1906 by B. T. Batsford, London. 372 pages. Price $1.50.

A Practical Treatise on the Steel Square, by Fred T. Hodgson. Published in 1904 by Frederick J. Drake & Company, Chicago. 222 pages, illustrated. Price 50c.

Engineering as a Vocation, by Ernest McCullough, C.E. Published in 1911 by David Williams Company, New York. 202 pages. Price 50 cents.

Hydraulic Cement, Its Properties, Testing and Use, by Frederick P. Spalding. Published by John Wiley & Sons, New York. 266 pages, illustrated. Price 50c.

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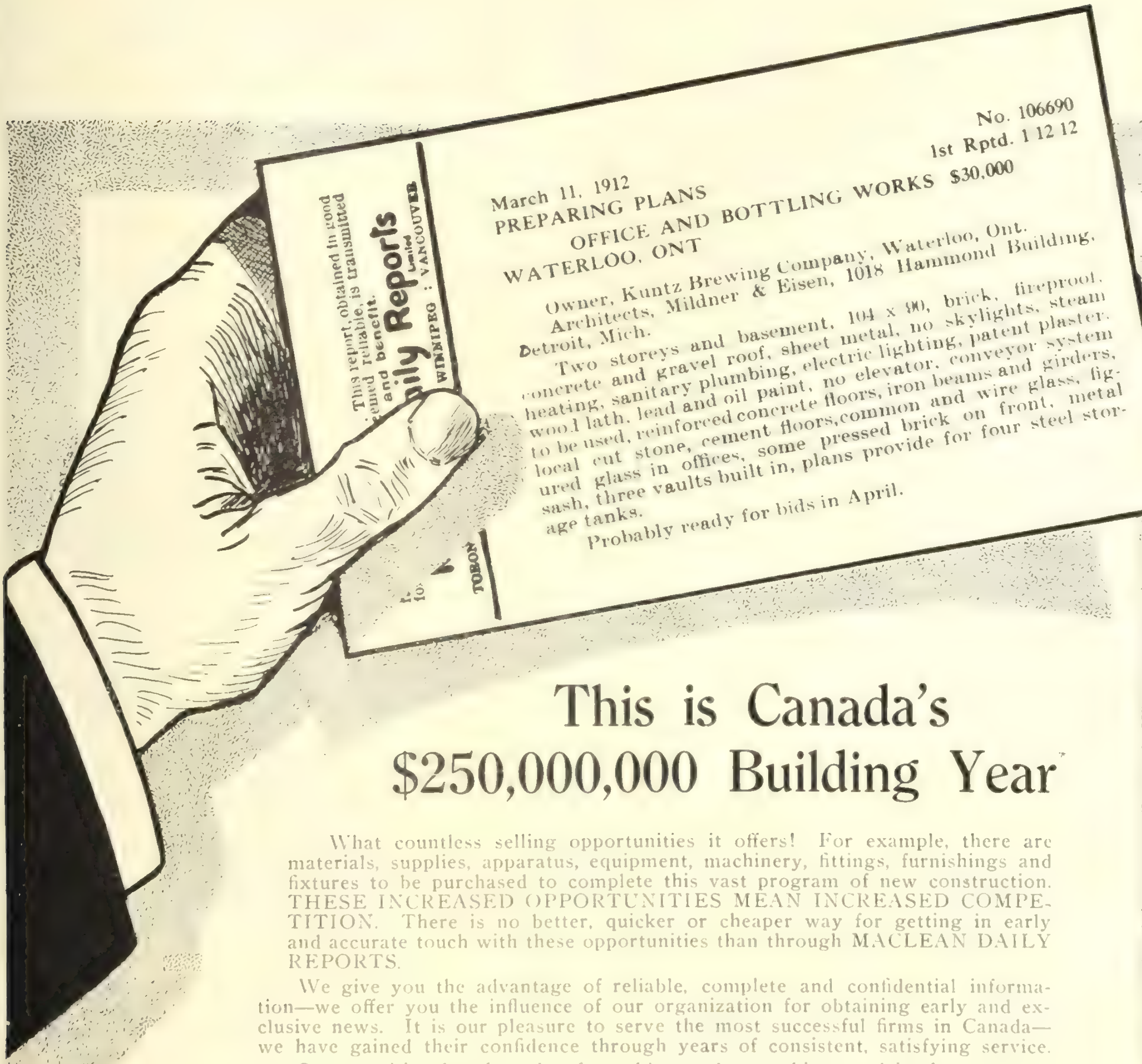

No. 106690
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March 11, 1912
PREPARING PLANS
OFFICE AND BOTTLING WORKS $30,000
WATERLOO, ONT

Owner, Kuntz Brewing Company, Waterloo, Ont.
Architects, Mildner & Eisen, 1018 Hammond Building, Detroit, Mich.

Two storeys and basement, 104 x 90, brick, fireproof, concrete and gravel roof, sheet metal, no skylights, steam heating, sanitary plumbing, electric lighting, patent plaster, wood lath, lead and oil paint, no elevator, conveyor system to be used, reinforced concrete floors, iron beams and girders, local cut stone, cement floors, common and wire glass, figured glass in offices, some pressed brick on front, metal sash, three vaults built in, plans provide for four steel storage tanks.

Probably ready for bids in April.

This is Canada's $250,000,000 Building Year

What countless selling opportunities it offers! For example, there are materials, supplies, apparatus, equipment, machinery, fittings, furnishings and fixtures to be purchased to complete this vast program of new construction. THESE INCREASED OPPORTUNITIES MEAN INCREASED COMPETITION. There is no better, quicker or cheaper way for getting in early and accurate touch with these opportunities than through MACLEAN DAILY REPORTS.

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As showing the attitude of our subscribers a firm wrote last week "we need your reports quite as much as a traveller needs the latest timetable. We have tried other plans, but they went where others go—when they do not go."

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119 Board of Trade Bldg.,
MONTREAL

Travellers Bldg.,
WINNIPEG

80 Hutchinson Block
VANCOUVER

Canadian building operation in 1912 totalled $185,898,535

Current Prices of Building Material.

BRICKS

The following are wholesale prices delivered at Toronto:—

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	12 00
Grey Stock Bricks	12 00
Wire cut bricks for foundation work	12 00
Porous terra cotta bricks	15 00
No 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock Lumber—

2 in. x 4 in. to 2 in. x 12 in., 8 to 14 ft.	$23 00	
2 x 4 to 2 x 12, 16 ft.	24 00	
2 x 4 to 2 x 12, 18 ft.	26 00	
1 in. Hemlock, No. 1	20 00	23 00
No. 1 Hemlock Decking	24 00	
No 2 Hemlock dimension and 1-in.	16 00	18 00

Pine—

1 in. common pine 8 to 12 in. wide rough	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	32 00	
No. 1 spruce flooring	26 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	25 00	
No. 1 pine V. or beaded sheeting	35 00	
No. 2 pine V. or beaded sheeting	31 00	

Pine trim for paint finish—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 25
8 in. pine base, per 100 ft.	3 25
10 in. pine base, per 100 ft.	4 25
4 in. pine window stool	2 75

Shingles—

XXX B. C. Clear Shingles, per M.	3 60
N. B. Extras	3 50
N. B. Clears	2 90
No. 1 pine lath, per M.	4 75
No. 2 pine lath	4 25
No. 1 spruce lath	4 00

Cedar Posts Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 25

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for box lots:—

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prizes per 100 ft. F.O.B. Winnipeg.

STEAM FITTERS' AND PLUMBERS' SUPPLIES

Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

Soil Pipe and Fittings

Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in.	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

CEMENT, STONE, STEEL, Etc.

Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.40; 1-inch, $1.45; ⅜-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.40 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

Lime, per cwt., delivered, not less than 1,500 lbs 33 cents; white, 43 cents.

Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

PAINT AND OILS

Pure White Lead, ground in oil, $8.50 per 100 lbs.

Boiled Linseed Oil, in bbls., 61c per gal. of 9 lbs.

Raw Linseed Oil, in bbls., 58c per gal. of 9 lbs.

Turpentine, in barrels, 64c. per gallon.

Pure Red Lead, dry $6.50 to $7.50 per 100 lbs.

Putty, pure linseed oil, in bulk, bbls., 3½c.

Putty, pure linseed oil, in 25-lb. tins, 4c.

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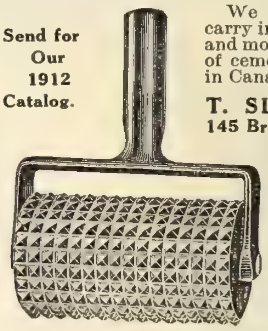
Cement Sidewalk Tools



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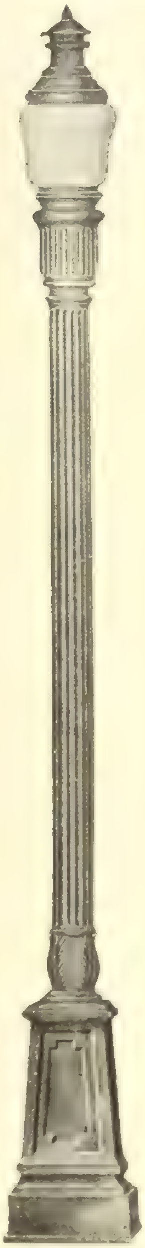

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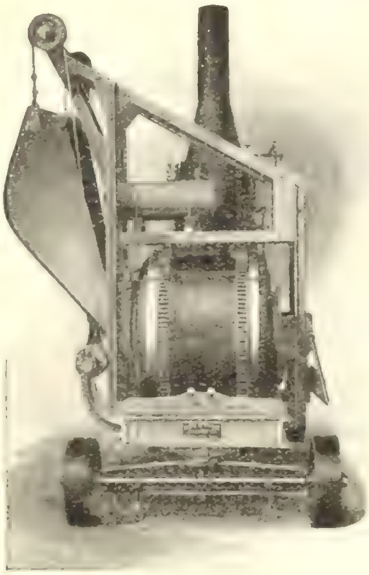
The Koehring "3 in 1"



We know that concrete mixers get hard service—and so we build THE KOEHRING to *stand* hard service.

We do it by putting the right kind of material into every part of THE KOEHRING—and *enough* material.

Its truck, for instance, is very rugged; it is made with a full 100% safety factor of strength.

Then there are features of design that add greatly to its lasting qualities.

For instance the rollers in THE KOEHRING are keyed onto the shaft *exactly as in a railroad truck*, preventing rapid wear of trunnion rollers and runaways and disalignment of drum, the cause of so many mixer troubles.

Our very complete side loader can be raised to an almost vertical position, so discharging into the drum *ithout pounding the bucket.*

Don't buy until you have investigated all these detailed superiorities of THE KOEHRING. The few points outlined here are but indications of the many you should know about.

The Koehring "3 in 1" Mixer Book No. 18 Gives Full Details

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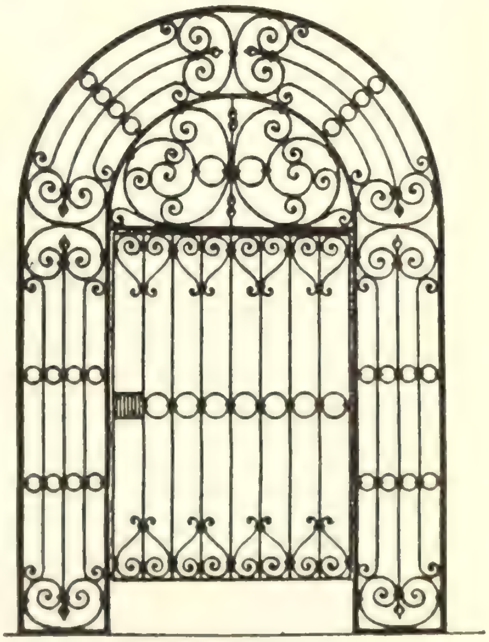

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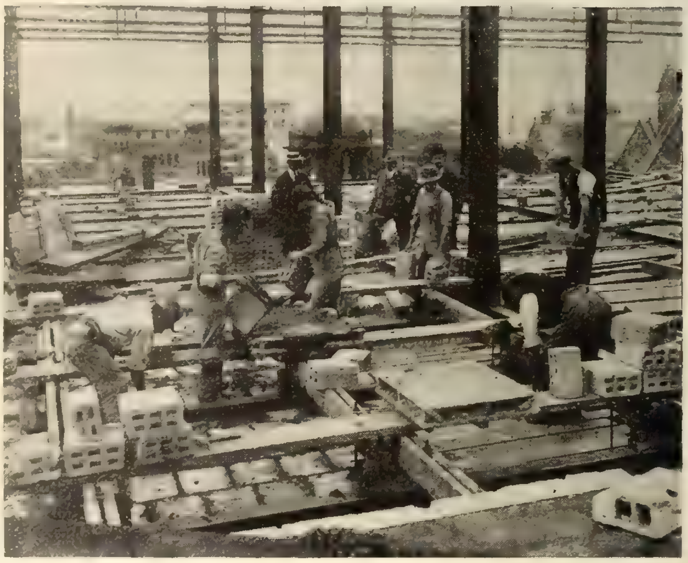

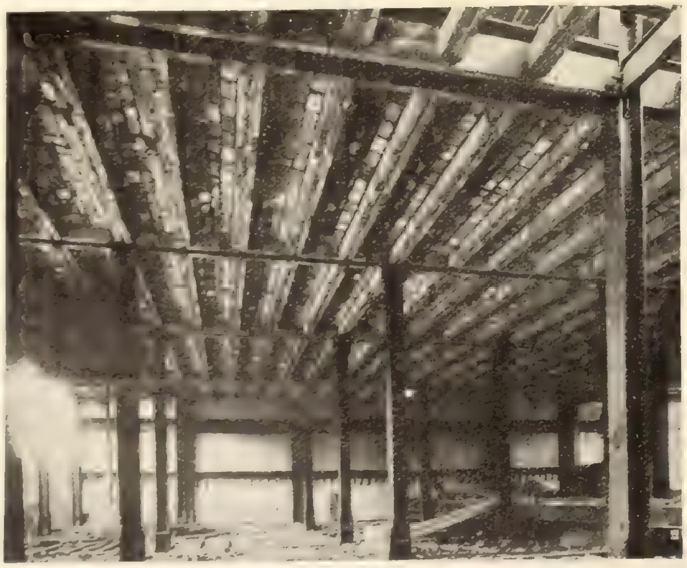

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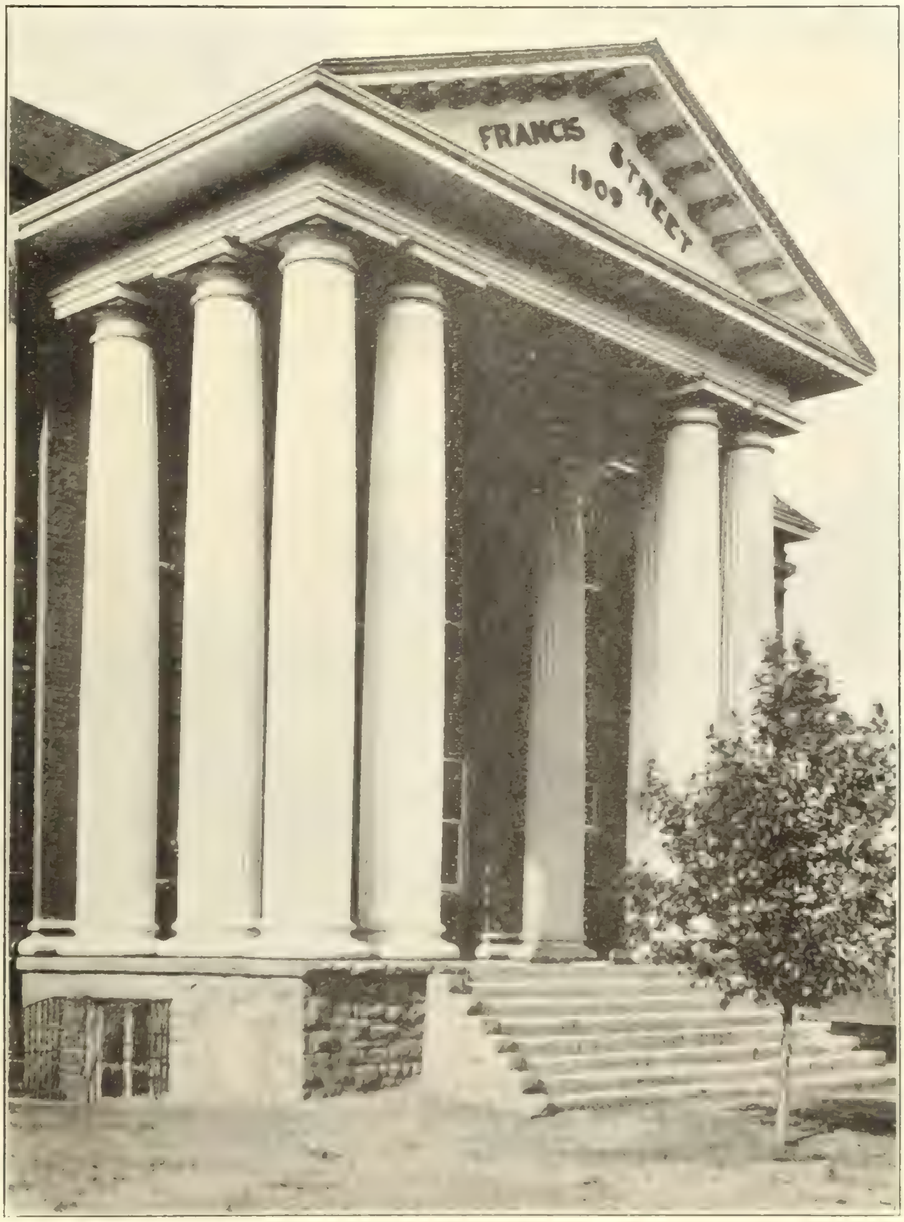

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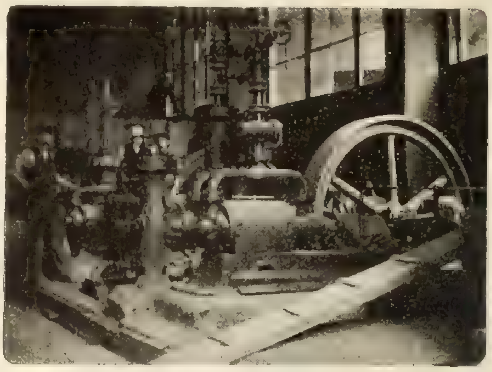

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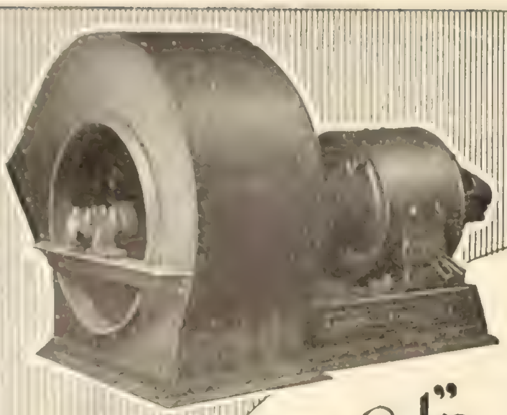

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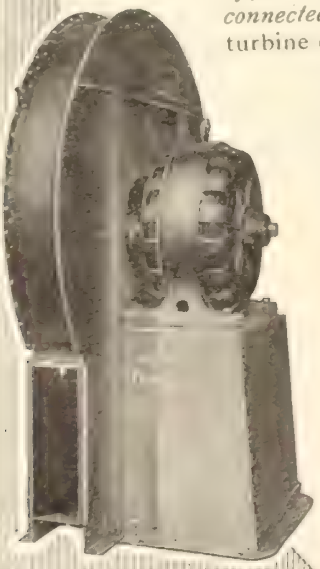

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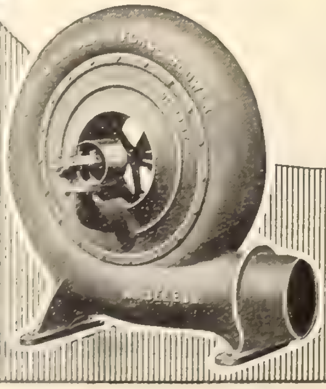

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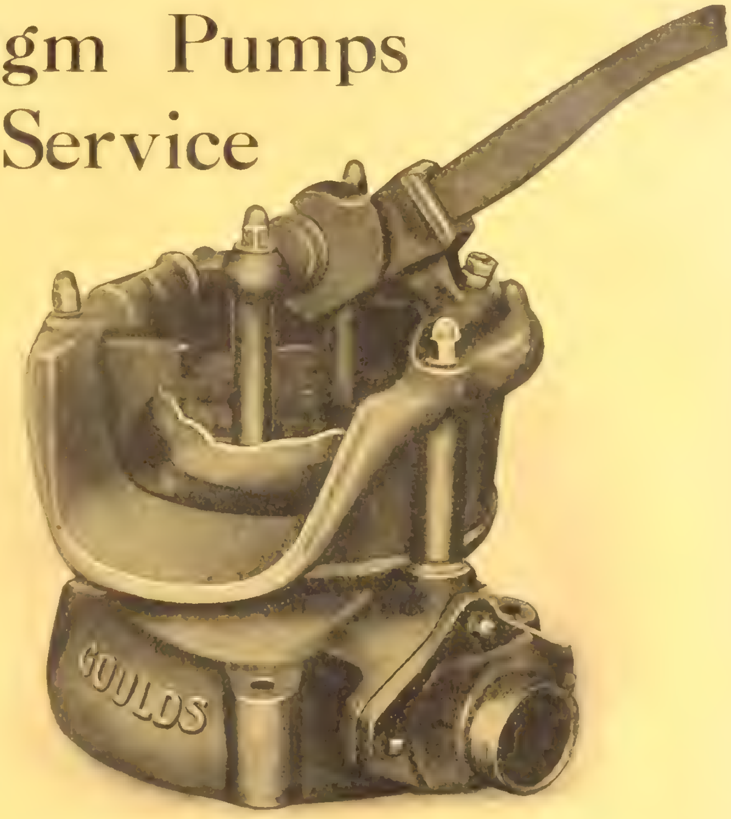

FIG. 1223—SIDE SUCTION

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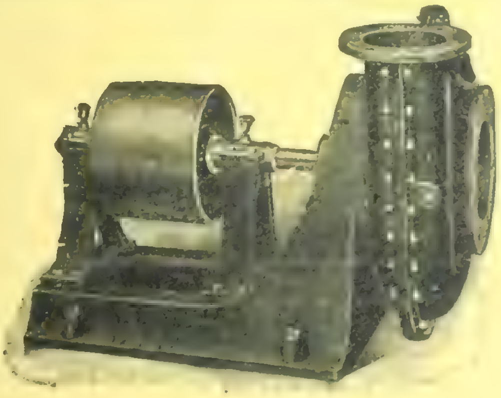

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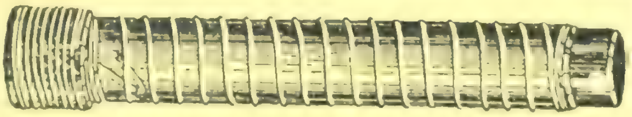

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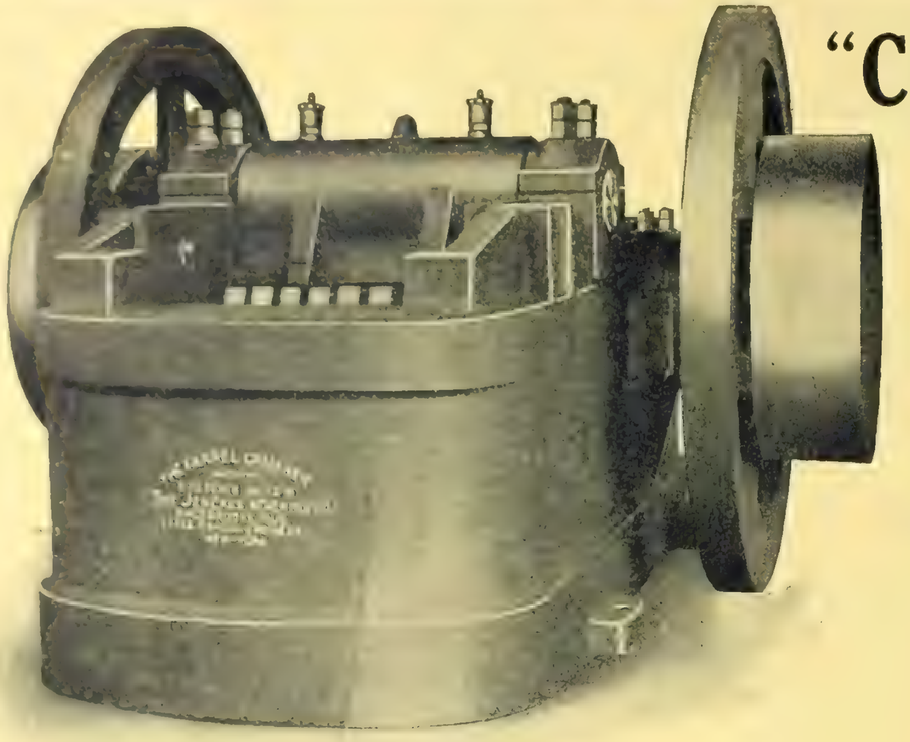

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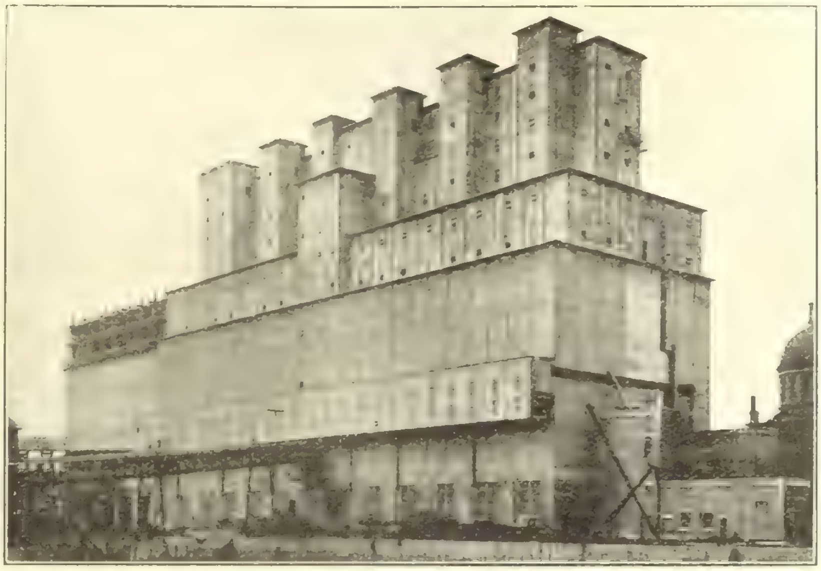

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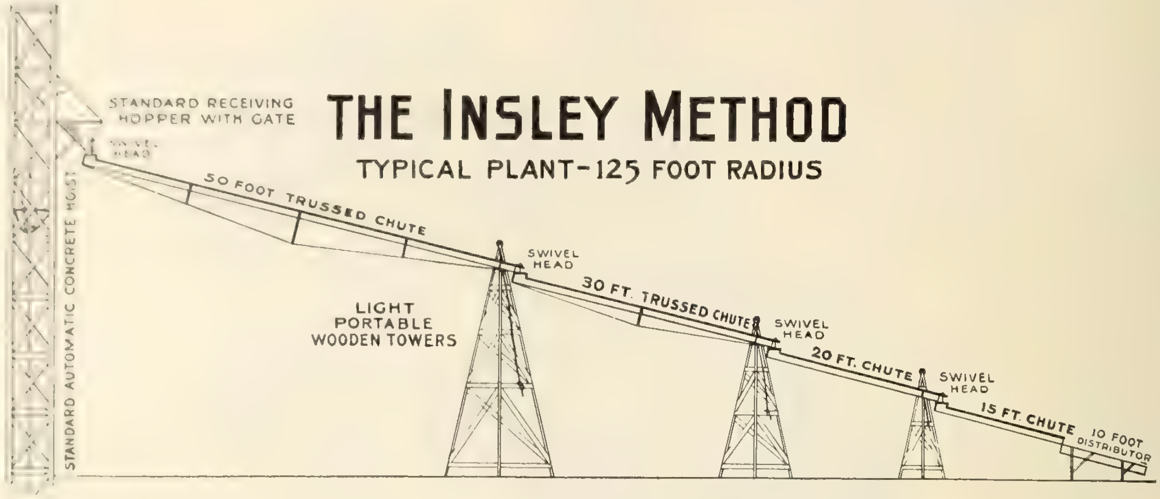

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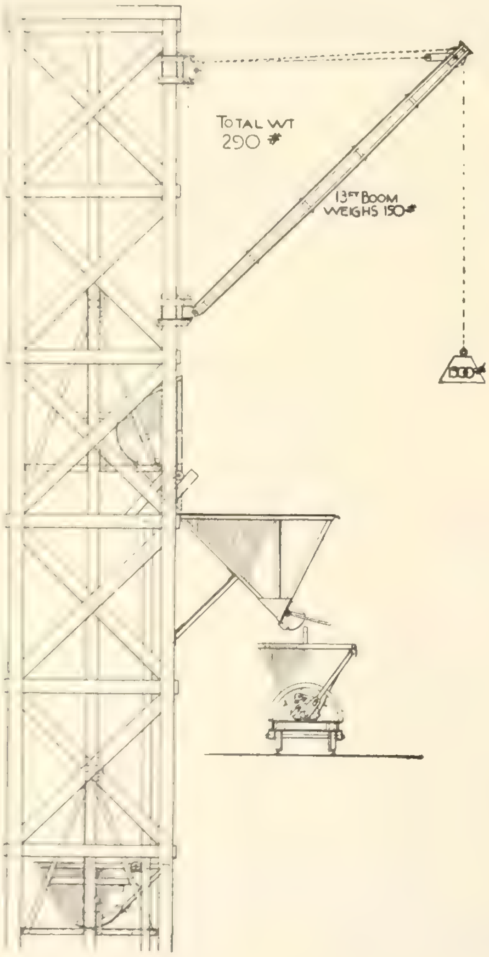

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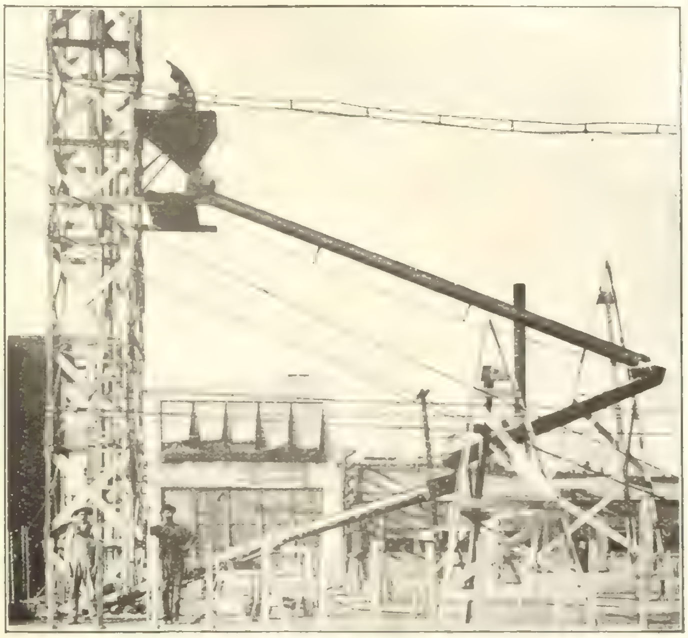

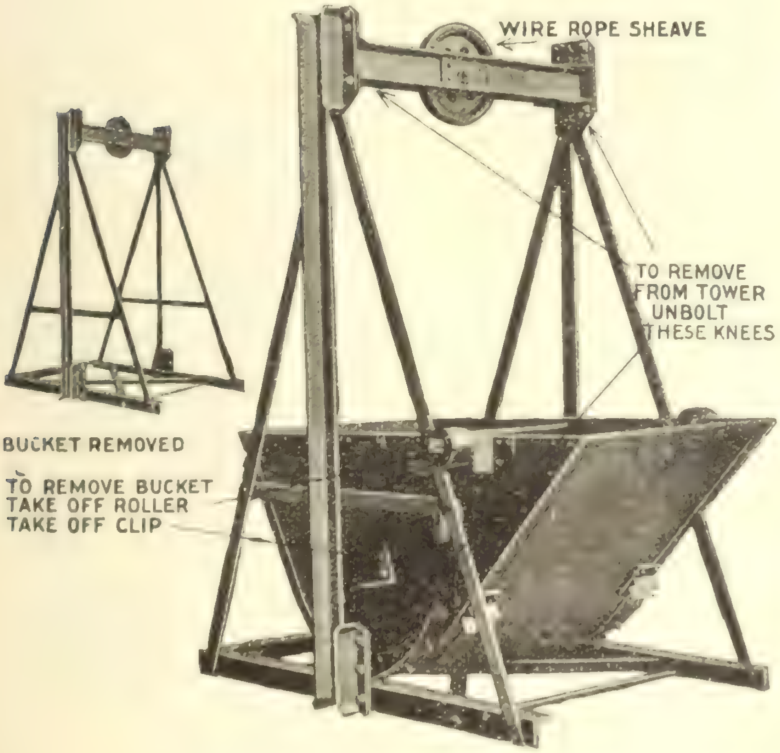
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Fire Brick
  Improved Equipment Co.
  Smyth & Ryan

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  Metal Shingle & Siding Co.
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Forges
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Furnaces (Special)
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Gas and Electric Light Fixtures
  Mitchell Co., Robert.

Gas Plants Complete
  Improved Equipment Co.

Gas Producers for Heating
  Improved Equipment Co.

Gas Machinery
  Improved Equipment Co.

Glass
  Consolidated Glass Co.
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  Canadian Buffalo Forge Co.
  Sheldons Limited
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  Escher Wyss & Co.

Hoisting Apparatus
  American Hoist & Derrick Co.
  Beatty & Sons, M.
  Browning Engineering Co.
  Canadian Fairbanks-Morse Co.
  Canadian Ingersoll-Rand Co.
  Doty Marine Engine & Boiler Co
  Inglis, John
  Jenckes Machine Co.
  Hopkins & Co., F. H.
  Lecky & Collis
  Marsh & Henthorn
  Mussens Limited
  Royce Limited
  Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
  Canadian Fairbanks-Morse Co.

Horse Stable Fittings
  Beatty Bros.

Hydrants
  Canada Iron Corporation
  Gartshore-Thomson Pipe Co.
  Kerr Engine Co.

(Continued on page 12)

Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Lumsden Building, Toronto

J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.

Don Valley Fireproofing, Bricks and Tile used throughout.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.

Traders Bank, Toronto

Carrere & Hastings and F. S. Baker, Associate Architects.

Don Valley Porous Terra Cotta Fireproofing and 2,0000,000 Don Valley Brick used.

Porous Terra Cotta Fireproofing

Royal Bank, Toronto

Eustace G. Bird associated with Carrere & Hastings, Architects. Norcross Bros., Contractors.

Don Valley Porous Terra Cotta Fireproofing and Brick used

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

Bell Telephone Building

Adelaide Street, Toronto

W. J. Carmichael, Architect. [illegible] Limited, Contractors.

Don Valley Porous Terra Cotta Fireproofing and Brick Used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

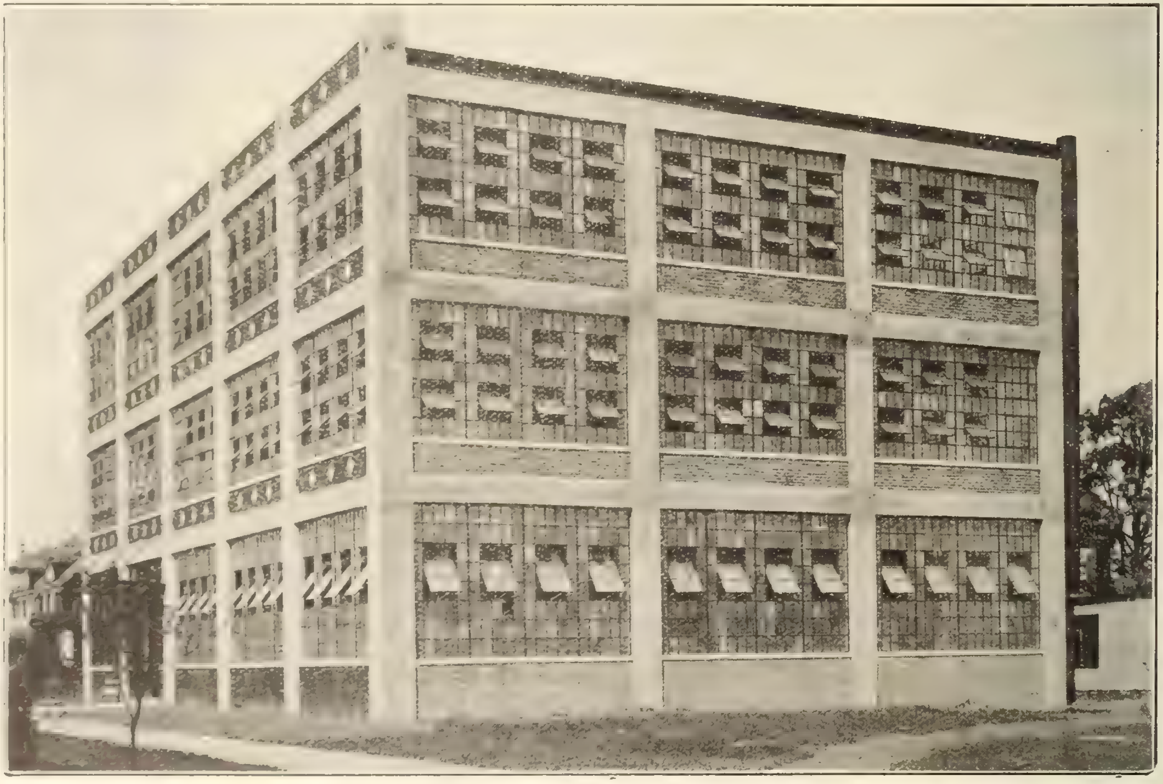
TORONTO - ONTARIO

LIGHT + VENTILATION = PROFITS

FENESTRA SOLID STEEL WINDOWS will provide your factory with an abundance of pure air; and light practically as good as that "out doors." Your employees will be able to do more and better work.

FENESTRA STEEL SASH not only increases production, but also reduces costs. Window upkeep expenses and artificial lighting bills are reduced almost to the vanishing point.

FENESTRA SASH is inexpensive compared with wooden sash, which is short lived and inflammable. It affords the minimum obstruction to light. It is attractive in appearance, strong and durable. Made to meet all conditions and sizes of window openings.



One of many buildings in Canada equipped throughout with "FENESTRA."

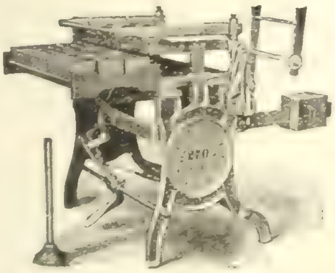
WRITE TO-DAY FOR CATALOG describing fully the merits of steel sash for all types of industrial buildings, large or small. FENESTRA has no equal for windows for foundries, power houses, factories, public buildings, machine shops, draughting rooms, railroad shops or any other buildings where the maximum light and ventilation are desired.

STEEL AND RADIATION, LIMITED

TORONTO, CANADA

CONCRETE MACHINERY

For all classes of work



Cement Brick Machine

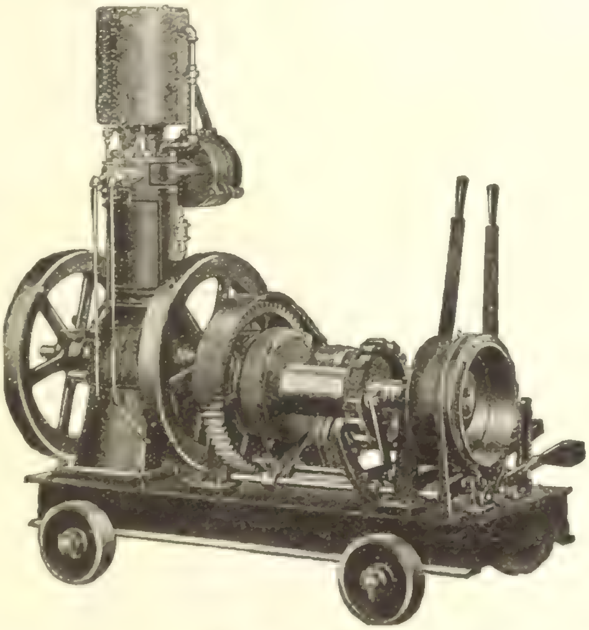
Lawn Vases

We are the only large manufacturers in Canada who specialize.

That is why we are able to supply the contractor with his every requirement in Machinery for the working of Concrete. Nothing counts like THE PRODUCTION ON A LARGE SCALE.

CONTRACTOR
TELL US YOUR
REQUIREMENTS

ASK FOR 1912
CATALOGUE



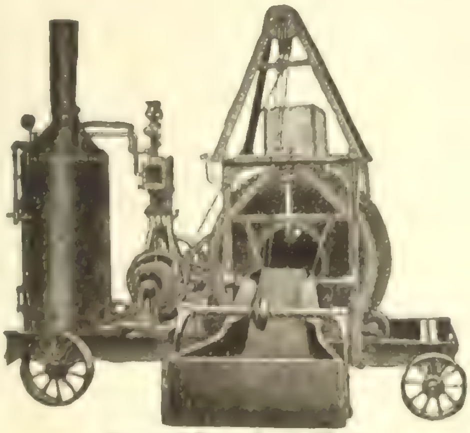
Builder's Double Acting Hoist

THE LONDON MACHINES are doing ALL WE CLAIM for them.

While we are BUILDING MACHINES we are BUILDING our REPUTATION.

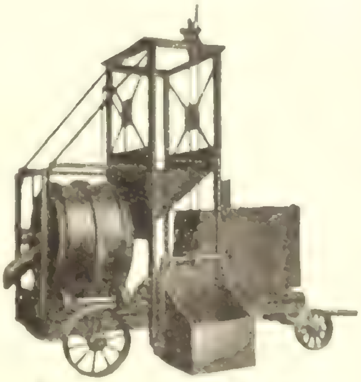
THE ENORMOUS SALE of OUR MACHINES is sufficient proof to us that it pays to build machines of the VERY BEST TYPE.

The CHEAP article we do not make.



Standard Drum Batch Mixer

We manufacture a full line of CONCRETE MACHINERY and Cement WORKING TOOLS, also CONTRACTORS' MACHINERY and EQUIPMENT.



Paving Machine with Side Loader

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:
WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, (106 Pleasant St.) G. B. Oland, Mgr.

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MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
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FORT WILLIAM, Northern Eng. & Supply Co.
MONTREAL, Foss & Hill Mach. Co.,
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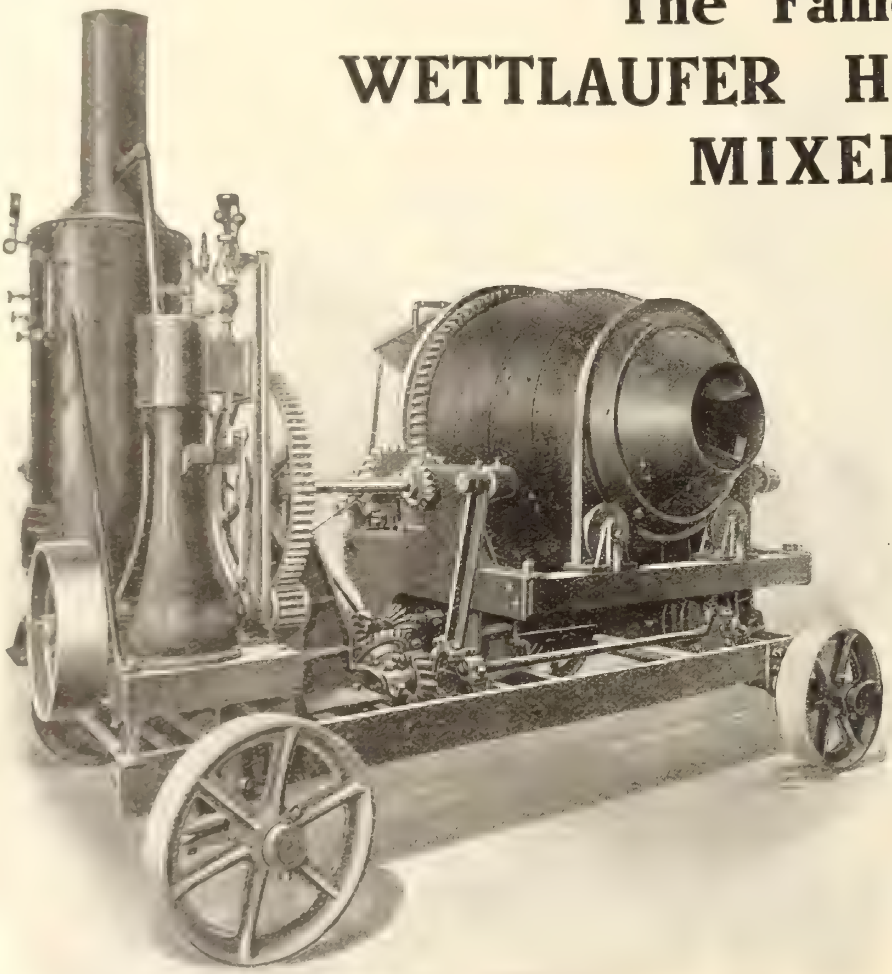
EVENTUALLY

—WHY NOT NOW?

You **must** have a **Good Mixer** some time—You can't go on putting up with a poor makeshift—You will realize some time that you **must** have a mixer that will do the best work, and when you realize that you will naturally turn to

The Famous WETTLAUFER HEARTSHAPE MIXER



This is the mixer that will do **good work** for you **all the time** — the mixer that saves you time and money and increases the efficiency of your equipment.

Strong Construction

Automatic Operation

Low Working Cost

Rapid and Perfect Mixing

Increased Capacity

Minimum Repairs

Full particulars and catalogue on request.

Come and see this mixer working—Continuous demonstrations at

WETTLAUFER BROTHERS

TORONTO, ONTARIO

FACTORIES : **Mitchell, Ont.** **Buffalo, N. Y.** **Detroit, Mich.**

AGENCIES :

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Alexandra Block, Howard Ave.
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Hooton & Moore
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MONTREAL OFFICE and WAREROOMS : **816 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave.**

For Your Next Shipment of Cement, Order

ROGERS

Portland Cement

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at

Kirkfield - Owen Sound - Hanover - Orangeville - St. Mary's

Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone—but cheaper.—A perfect imitation—Adaptable to all ornamentation or architectural decoration, both interior and exterior.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

28 King St. West **Toronto, Ontario**

Western Sales Manager

W. J. DINNEN & CO., Winnipeg, Man.

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Linde British Refrigeration Co.

Insulating Compounds
Canadian Mineral Rubber Co.
Standard Underground Cable Co. of Canada, Limited

Interior Finish and Doors
Batts Limited
Canada Office & School Fur. Co.
Oshawa Int. Fittings Co.
Rhodes Curry & Co.

Kilns
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F

Lime
Jamieson Lime Co.
Ontario Lime Association

Lime Kilns
Improved Equipment Co.

Locomotives
Buffalo Pitts Co.
Canadian Boving Co.
Montreal Locomotive Works
Canada Foundry Co.

Marble
Dominion Marble Co.
[illegible] Company
Mississquoi Marble Co.

Metal Lath
Greening Wire Co., B.
Metallic Roofing Co.
Noble, C. W.
Steel & Radiation Ltd.

Metal Forms
Hotchkiss Lock Metal Form Co.

Meters, Electrical
Ferranti Electrical Mfg. Co.

Meters, Water
Hopkins & Co., F. H.
McDougall Caledonian Iron Wks
Neptune Meter Co.

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Jones & Glassco

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Garlock Packing Co.

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Canadian Mineral Rubber Co.

Paints and Varnishes
Elaterite Paint Co.
Goheen Co.
Pinchin, Johnson & Co.

Paving Cement
Canadian Mineral Rubber Co.

Paving and Paving Materials
Dominion Creosoting Company
Metropolitan Paving Brick Co.
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Paterson Mfg. Co.

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Canadian Pipe Co.
Dominion Concrete Co.
Dominion Wood Pipe Co.
Gartshore-Thomson Pipe Co.
Munderloh & Co.
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Pedlar People Limited.
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Mitchell Company, Robt.

Pneumatic Machinery
Canadian Ingersoll-Rand Co.

Portable Saws
Canadian Fairbanks-Morse Co.

Portable Track
Bechtels Limited

Power Engines
Inglis Company, John

Pumps and Pumping Machinery
Bates & Edmonds
Beatty & Sons, M.
Canada Foundry Co.
Canadian Boving Co.
Canadian Buffalo Forge Co.
Canadian Fairbanks-Morse Co.
Canadian Ingersoll-Rand Co.
Cook, A. D.
Escher Wyss & Co.
General Supply Co.
Hamilton Mfg. Co., Wm.
Hopkins & Co., F. H.
Inglis & Co., John
McDougall Caledonian Iron Wks.
Smart-Turner Machine Co.
Waterous Engine Works Co.
Mussens Limited
Ontario Wind Eng. & Pump Co.

Quarry Machinery
Canadian Ingersoll-Rand Co.
Improved Equipment Co.
Lecky & Collis
George Anderson & Co.

Railway Supplies
Gartshore, John J.
Hopkins & Co., F. H.
Mussens Limited

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Linde British Refrigeration Co.

Reinforcements, Concrete & Steel
Ambursen Hydraulic Cons. Co.
Canada Steel Co., Ltd.
Canada Wire & Iron Goods Co.
Greening Wire Co., B.
Steel Co. of Canada
Steel & Radiation Ltd.
Trussed Concrete Steel Co.
Turner, C. A. P.

Revolving Stone Screens
Greening Wire Co., B.

Road Asphalt
Canadian Mineral Rubber Co.

Road Machinery
Erie Machine Shops
Lecky & Collis
Morrison & Co., T. A.
Mussens Limited
Waterous Engine Works Co.
Western Wheeled Scraper Co.

Roofing Material
Asbestos Mfg. Co.
Can. H. W. Johns-Manville Co.
Canadian Mineral Rubber Co.
Canadian Supply Company
Metallic Roofing Co.
Noble, Clarence W.
Paterson Mfg. Co.

(Continued on page 14)

ACCURATE METERS

Ferranti

Glass Case—Top Connections

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Steel Case—Top or Bottom Connections

The Ferranti Electrical Co. of Canada, Limited

TORONTO, 90 Sherbourne St. WINNIPEG, 56 Albert St.

BAY STATE

This is the man that made

BAY STATE
Brick and Cement Coating

famous, and it in turn has made the name **WADSWORTH, HOWLAND & CO., Inc.** known wherever a coating for concrete, stucco, or brick is used.

He's the trade mark not only of the best concrete, stucco or brick coating in the market but of the WHOLE BAY STATE line of dependable paints, varnishes enamels and stains that stand weather and wear.

Ask your dealer for them. If he cannot supply you write us for booklet M. that tells about the BAY STATE line

Wadsworth, Howland & Co., Inc.
Paint and Varnish Makers and Lead Corroders
82-84 Washington Street, Boston, Mass.
New York Office, 156 Fifth Ave.

WESTERN DUMP CARS

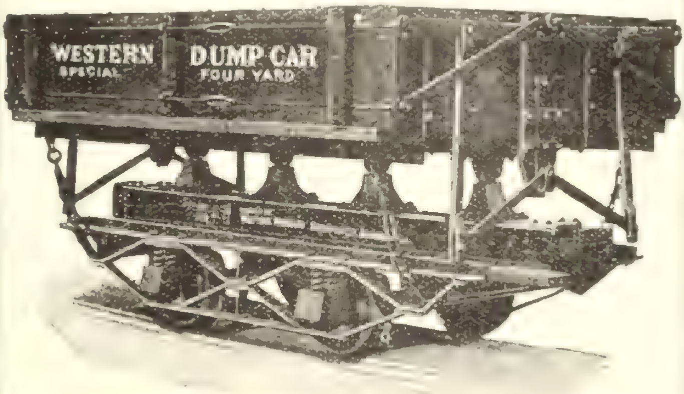
can be dumped and righted by fewer men and in less time than required for the same operation on many other cars

Prominent Contractors have made the above statement time and time again, and its a proven fact. Just think of the saving.

Western Air Dump Cars are used by many of the largest Railroads and at the Panama Canal. There must be many reasons.

Let us tell you them.

WESTERN WHEELED SCRAPER CO.
AURORA, ILLINOIS
Earth and Stone Handling Machinery
E. P. Jamison & Company, Ltd., Vancouver
Agents for British Columbia



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS				
	1903	$ 0.00	1908	$ 93.26
	1904	3.30	1909	200.46
	1905	9.35	1910	14.07
	1906	37.33	1911	2.29
	1907	16.11		

Total $376.17 or $5\frac{3}{4}$c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.
Hagersville, Ont. Limited

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Sand and Gravel
  Sand and Supplies Ltd
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Sewer Joint Asphalt
  Canadian Mineral Rubber Co.

Sewer Pipe
  Britnell & Co.
  Canada Iron Corporation
  Dominion Sewer Pipe Co.
  Gartshore Thomson Pipe Co.
  National Iron Works
  Ontario Sewer Pipe Co.
  Smyth & Ryan
  Standard Clay Products Ltd.

Sewer Trenching
  Lecky & Collis

Sound Deadening
  Cabot Inc., Samuel

Shovels (Steam)
  Browning Engineering Co.
  Beatty & Sons, M.
  Canada Foundry Co., F. H.
  Hopkins & Co., F. H.
  Montreal Locomotive Works
  Mussens Limited
  Thew Automatic Shovel Co.
  Willis Shaw Mach. Co.

Shovels
  Lundy Shovel & Tool Co.

Smoke Stacks
  Des Moines Bridge Co.
  Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
  Cabot, Inc., Samuel
  Pinchin, Johnson & Co.

Steam Apparatus
  Canadian Buffalo Forge Co.
  Sheldons Limited
  Sturtevant Co. of Can. Ltd., B. F

Steam Turbines
  McDougall Caledonian Iron Wks.

Steel
  Canada Steel Co., Ltd.
  Dominion Steel Castings Co.
  Lecky & Collis
  Provincial Steel Co.

Steel Bars
  Canada Steel Co., Ltd.
  Steel Co. of Canada.
  Steel & Radiation, Ltd.

Stone
  Britnell & Co.
  Brodie, Jas.
  Consolidated Stone Co.
  Contractors' Supply Co.
  Corinthian Stone Co.
  Crushed Stone, Limited
  Hagerville Contracting Co.
  Mahan & Company
  McMillan & Son, W.
  Morrison & Co., T. A.
  Myers, Oakley
  Queenstown Quarry Co.
  Roman Stone Co.
  Sackville Freestone Co.
  Sand & Supplies
  Smyth & Ryan

Stone Saws
  Anderson, Geo

Structural Iron and Steel
  Canada Steel Co.
  DesMoines Bridge Co.
  Dominion Bridge Co.
  Dominion Steel Castings Co.
  Hamilton Bridge Works Co.
  Mackinnon Holmes & Co.
  McNeil & Co., W. P.
  Phoenix Bridge & Iron Works
  Provincial Steel Company
  Reid & Brown
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  Canadian Mineral Rubber Co.
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  Des Moines Bridge Co.
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  Marsh & Henthorn
  McDougall Caledonian Iron Wks
  Ontario Wind Eng. & Pump Co.
  Piggott & Co., Thos.

Tents
  Waterous Engine Works Co.

Testing and Inspecting Bureau
  Hunt & Co., Robt. W.

Valves
  Canada Iron Corporation
  Gartshore-Thomson Pipe Co.
  Kerr Engine Co.

Ventilating & Heating Apparatus
  Canadian Buffalo Forge Co.
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Vacuum Cleaners
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Varnishes—Insulating
  Standard Underground Cable Co. of Canada, Limited

Waterproofing
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  Can. H. M. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Ceresit Waterproofing Co.
  Elaterite Paint Co.
  Pinchin, Johnson & Co.

Water Softeners and Filters
  American Water Softener

Water Turbines
  Canadian Boving Co.
  Escher Wyss & Co.
  Hamilton Mfg. Co., Wm.
  McDougall Caledonian Iron Wks.

Wire
  Canada Wire & Cable Co.
  Standard Underground Cable Co. of Canada, Limited

Wires and Cables
  Royce Limited

Wire Guards and Screens
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Wire Rope
  Canada Wire & Cable Co.
  Greening Wire Co., B.
  Smith, Thos. & Wm.
  Steel Co. of Canada

Wood Turnings
  Automatic Wood Box & Turning Company

These High-Grade Asphalts Insure High-Class Results

For 17 years "Pioneer" Asphalts have been specified by Engineers for important projects in which the highest efficiency and the greatest durability were of first consideration. The record of these materials is a record of success.

"Pioneer" Road Asphalt—For durable, waterproof, auto-proof macadam roads.

"Pioneer" Paving Cement—For reliable, economical Sheet Asphalt Pavements.

"Pioneer" Filler Asphalt—For filling the interstices in brick and block pavements. Sanitary—and always stays in place.

"Pioneer" Road Surface Asphalt—For building up macadam roads. Lays the dust—only one application a year necessary.

"Pioneer" Asphalt Mastic Floors—For manufacturing plants, breweries, canning establishments, ice plants, warehouses, etc.

"Pioneer" Asphalts have a Gilsonite base—99.5 per cent pure bitumen—and in actual service have established their supremaey. Specifications and further particulars on request.

In addition to the above we invite attention to "Pioneer" Mineral Rubber Pipe Coating, "Pioneer" Waterproofing Asphalt, "Pioneer" Sewer Joint Asphalt, "Sterling" Waterproofing Products, Structural Paints, Roof Paints, etc., etc.

THE CANADIAN MINERAL RUBBER CO., Ltd.

Montreal Winnipeg Victoria London, Eng.

Barrett Specification Roofs

Economical on Small Roofs, Too

We have been advertising Barrett Specification Roofs with illustrations of enormous buildings and manufacturing plants where the roof areas run as high as a million square feet. In such cases, scientific estimates of the unit cost are made, that is, the cost per square foot per year of service. Such calculations simply compel the adoption of this type of roofing.

The owner of an ordinary building, like that illustrated above, with a roof area of a few thousand square feet, also saves money by adopting Barret Specification Roofs.

There is very little difference in unit cost between a big roof and a little one of this type, and the slight difference is completely submerged in the big gap between the cost of this and the next most economical roofing—i.e., Barret Specification Roofs are so much more economical per year of service than any other kind that a simple examination of the figures would compel their use if they cost 50 per cent. more than they do.

As manufacturers of coal tar pitch and felt, we are interested in the success of this type of roofing. We, therefore, have made the Barrett Specification standard in the trade in order to protect owners and architects against poor workmanship and materials and insure maximum service at minimum cost.

Copy of The Barrett Specification will be sent free on request

Special Note

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If an abbreviated form is desired, however, the following is suggested:

ROOFING—Shall be a Barrett Specification Roof laid as directed in printed Specifications, revised August 15, 1911, using the materials specified and subject to the inspection requirement.

THE PATERSON MFG. CO., Limited

Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

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[illegible] 82
[illegible]
Albert Manufacturing Company 85
[illegible] Motor Truck Company 40
[illegible] American Portland Cement Works 113
[illegible] 83
[illegible] 88
[illegible] 2
[illegible] 25
[illegible]
[illegible] 22
[illegible]
[illegible] 110
[illegible] 113
[illegible] 88

[illegible] 91
Bateman Wilkinson Company 41
[illegible]
Beath & Son, Limited, W. D. 30
Beatty & Sons, Limited, M. 34
[illegible]
[illegible]
Bennett, Robert
Black Building Supply Company 37
Bowman & Connor 104
Blystone Machinery Company 103
Britnell & Company, Limited 94
Browning Engineering Company 25
[illegible] 99
Brown Hoisting Machinery Company 107
Brown Machine Company 94
Brodie & Company, James
[illegible] 36

Cabot, Incorporated, Samuel
[illegible] R. 104
Canada Cement Company 3
Canada Foundry Company, Limited 35
Canada Iron Corporation Limited 99
Canada Lifting Jack Company 86
Canada Steel Company 25
Canada Wire & Cable Company 33
Canada Wire & Iron Goods Company 87
Canadian Boving Company 26
Canadian Bridge Company 96
Canadian Buffalo Forge Company 114
Canadian Fairbanks-Morse Co., Ltd. 115
Canadian H. W. Johns-Manville Co. 41
Canadian Kellogg Company
Canadian Mineral Rubber Company 14
Canadian Office School Furniture Co. 104
Canadian Pipe Company, Limited 92
Canadian Ingersoll-Rand Company 1
Canadian Supply Company 29
Ceresit Waterproofing Company 101
Chain Belt Company 38
Chipman & Power 104
Clapham & Sons, John
Conduits Company Limited 99
Consolidated Stone Company
Consolidated Plate Glass Company 109
Consumers Gas Company
Contractors' Supply Company, Ltd. 94
Cook, A. D.
Corinthian Stone Company
Crown Gypsum Company
Crushed Stone Limited 87

Dake Engine Company 99
Dennis Wire & Iron Works Company 85
DesMoines Bridge & Iron Company 97
Dikeman Surveyor Company 104
Dickson Bridge Works
Dominion Bridge Company 96
Dominion Concrete Company 84
Dominion Creosoting Company 111
Dominion Ornamental Iron Company
Dominion Marble Company 19
Dominion Sewer Pipe Company 18
Dominion Steel Castings Company 24
Dominion Wood Pipe Company 88
Don Valley Brick Works 7
Doty Marine Engine & Boiler Co. 23
[illegible] 42

Elaterite Paint Company
Engineering Works of Canada 112
Erie Machine Shops 102
Escher Wyss 101

Farmer, John T. 104
Ferguson, H. S. 104
Ferranti Electrical Company 12
Foundation Company 105
Fuce & Smith 104

Galt Engineering Company, John 104
Galt Stove & Furniture Company 84
Gardner & Saxby 104
Gartshore, John J. 104
Gartshore-Thompson Pipe & Foundry Co. 98
Gaudry & Company, L. H. 103
Gibbs & Canning 109
Goheen Manufacturing Company 22
Goodyear Tire & Rubber Co. of Canada, Ltd. 39
Greening Wire Company, Limited, B.
Gurley, W. & L. 89

Hagersville Contracting Company 13
Hancock, Jr., H. Syd. 104
Hamilton Art Glass Co., Ltd.
Hamilton Bridge Company 26
Hamilton Mfg. Company, Wm. 19
Hamilton Pressed Brick Company 106
Harvey, J. 102
Heinicke Company, H. R. 18
Hepburn, John T. 31
Hobbs Manufacturing Company
Hopkins & Company, F. H. 116
Hotchkiss Lock Metal Form Company
Hunt & Company, Robert W. 104

Improved Equipment Company 90
Imperial Wire & Cable Company 115
Inglis Company, John 35
International Marine Signal Co. 85-88

Jamieson Lime Company 100
Jenckes Machine Company 2
Jennings & Ross 89
Jones & Glassco 40

Kennedy, James C. 104
Kerr Engine Company, Limited
Koehring Machine Company 110

Laurentian Granite Company 104
Laurie & Lamb 95
Lautz Company
Lea, R. S. 104
Lecky & Collis 17
Leonard & Sons, E. 87
Linde British Refrigeration Company
London Concrete Machinery Company 9
Lundy Shovel & Tool Company
Luxfer Prism Company

MacLean Daily Reports
Mahan & Company 86
Mannesmann Tube Company
Marsh & Henthorn, Limited 84
McDowall, R. 104
McKinnon Holmes & Company 95
McMillan & Sons, W. 86
McNeil & Company, William P. 98
Meadows, George B. 41
Metal Shingle & Siding Company
Metallic Roofing Company 85
Miller & Company, Geo. M.
Missisquoi Marble Co., Ltd. 88
Mitchell Company, Limited, Robert 96
Montreal Locomotive Works Limited 87
Montreal Real Estate Show 91
Morrison & Company 102
Mussens Limited 4
Myers, Oakley 87

Napanee Iron Works 17
National Bridge Company of Canada 97
National Iron Works Limited 99
National Pipe & Foundry Company 98
Neptune Meter Company 97
Nelsonville Brick Company 83
Noble, Clarence W. 21
Northwestern Terra Cotta Company 90
Nova Scotia Clay Works 90

Ontario Asphalt Block Co., Ltd. 113
Ontario Lime Company, Limited
Ontario Sewer Pipe Company 18
Ontario Wind Engine & Pump Co. 87
Ormsby Limited, A. B. 20
Oshkosh Manufacturing Company 33
Owen Sound Iron Works

Pacific Coast Pipe Company 1
Paterson Manufacturing Company 15
Pedlar People 93
Phoenix Bridge Company 90
Piggott & Company, Thomas
Pinchin Johnson & Company 114
Power & Son
Provincial Steel Company 24

Queenstown Quarry Company 99

Reid & Brown 104
Rhodes Curry Company, Limited 103
Richardson, J. E. 25
R. I. W. Damp Resisting Paint Co. 37
Rogers, Limited, Alfred 11
Rogers Supply Company 41
Roman Stone Company 28
Royce Limited 107

Sackville Freestone Company, Limited 21
Sand & Supplies Limited 98
Sarnia Bridge Company, Limited 97
Sheldons Limited 20
Sheppard, James 100
Silcox, A. B.
Slack & Company, T. 102
Smart-Turner Machine Company 1
Smith Limited, Thos. & Wm. 108
Smyth & Ryan 90
Standard Clay Products Limited 32
Standard Ideal Company 42
Standard Steel Construction Co. 97
Standard Underground Cable Co. of Canada 19
Stanley Company, W. F.
Star Expansion Bolt Company
Steel Company of Canada 24
Steel & Radiation 8
Stinson-Reeb Builders' Supply Co.
Structural Steel Company 96
Sturtevant Co. of Canada, Ltd., B. F. 112

Taylor, J. & J.
Thew-Automatic Shovel Company 23
Tiffin Wagon Company 109
Toledo Wheelbarrow Company
Toronto Plate Glass Importing Co. 1-90
Toronto Iron Works 113
Troy Wagon Company
Trussed Concrete Steel Company 94
Tuec Company
Turner, C. A. P.

United States Steel Products Co. 27
United Typewriter 19
Urschel-Bates Valve Bag Company 86

Wadsworth Howland Co. 13
Waterous Engine Works Company 33
Weeks, Arthur L. 104
Welch & Company, H. J. 104
Wells & Gray
Western Canada Contractor 94
Western Wheeled Scraper Company 13
Wettlaufer Bros. 10
Woodstock Wind Motor Company 32
Wooliscroft & Son, G. 109

York Sand & Gravel Company 94

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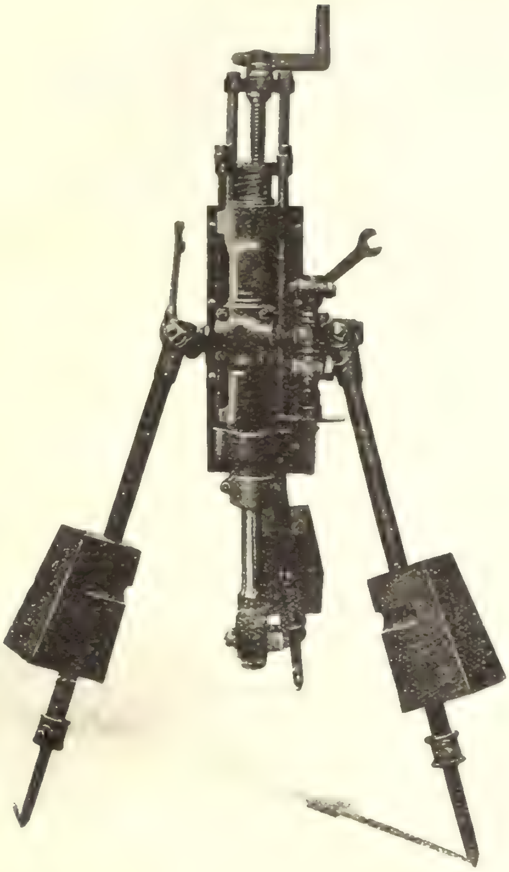

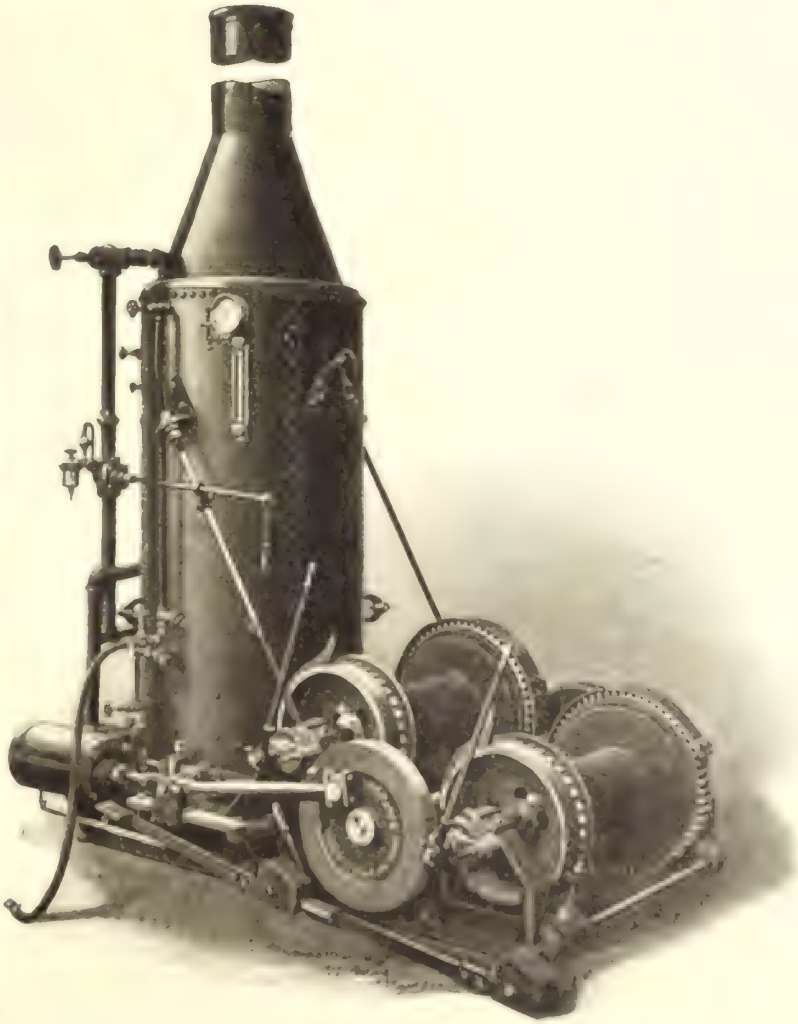

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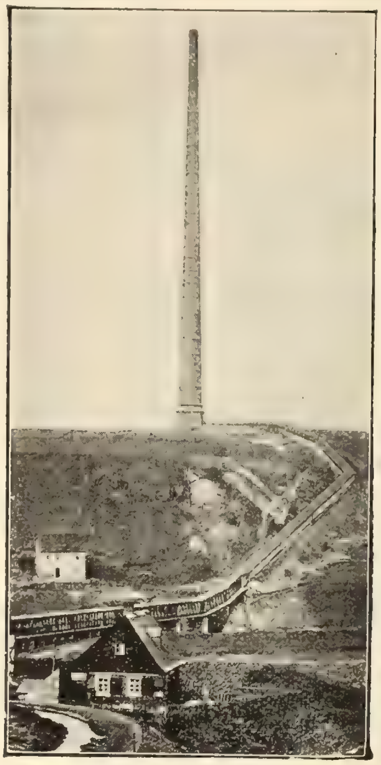

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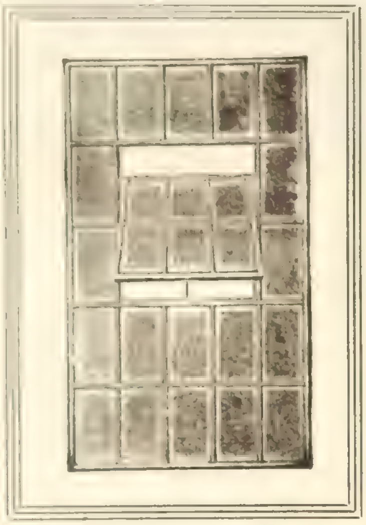

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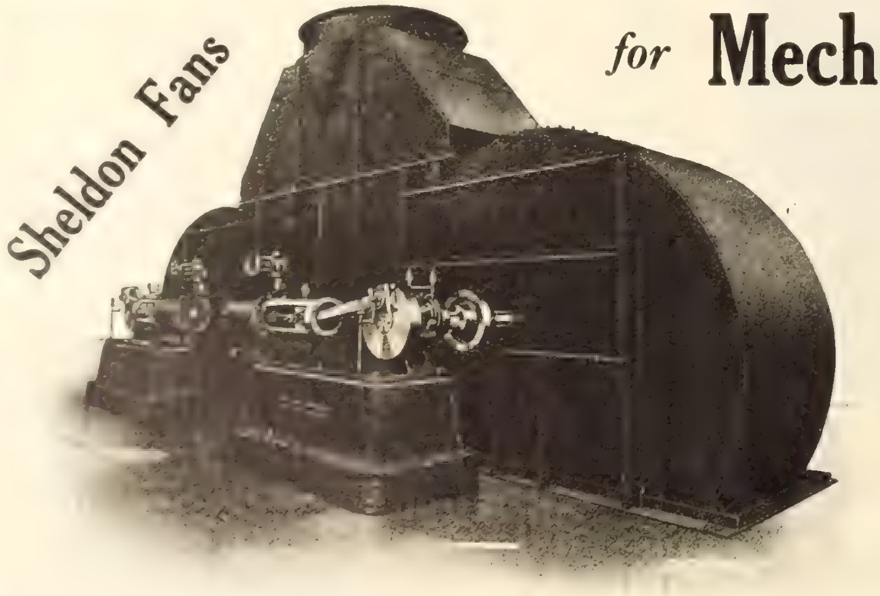

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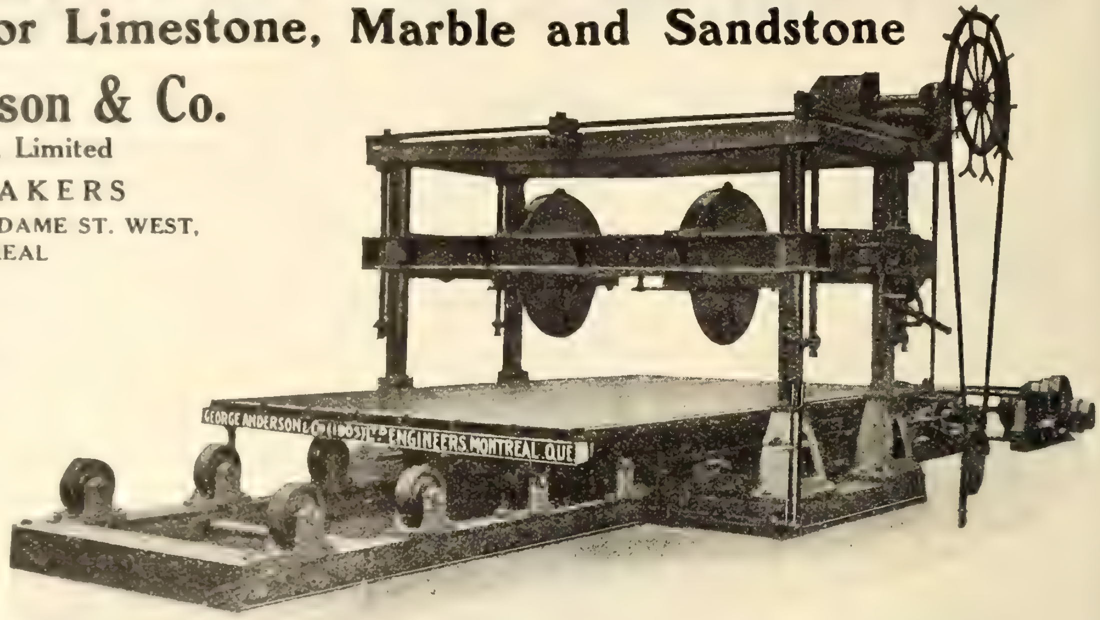

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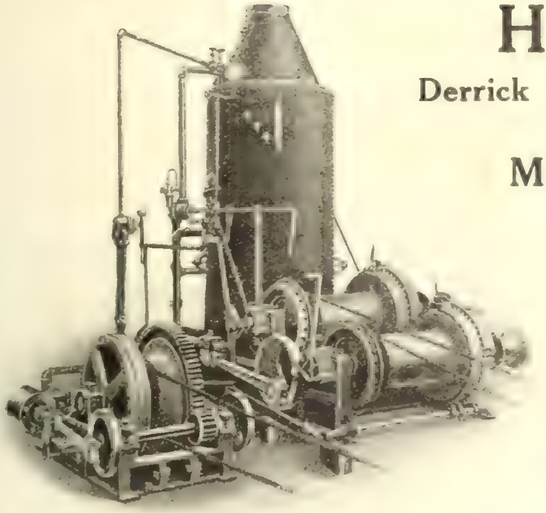

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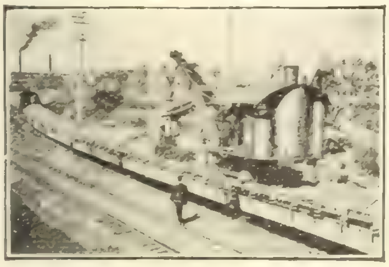

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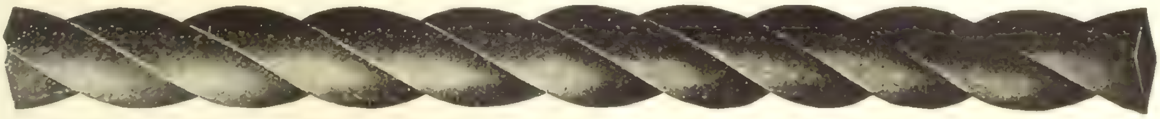

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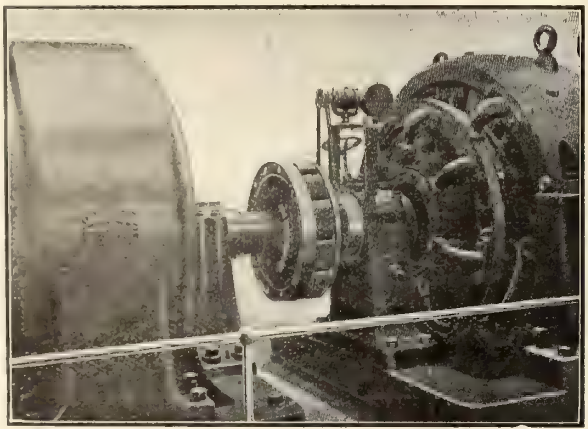

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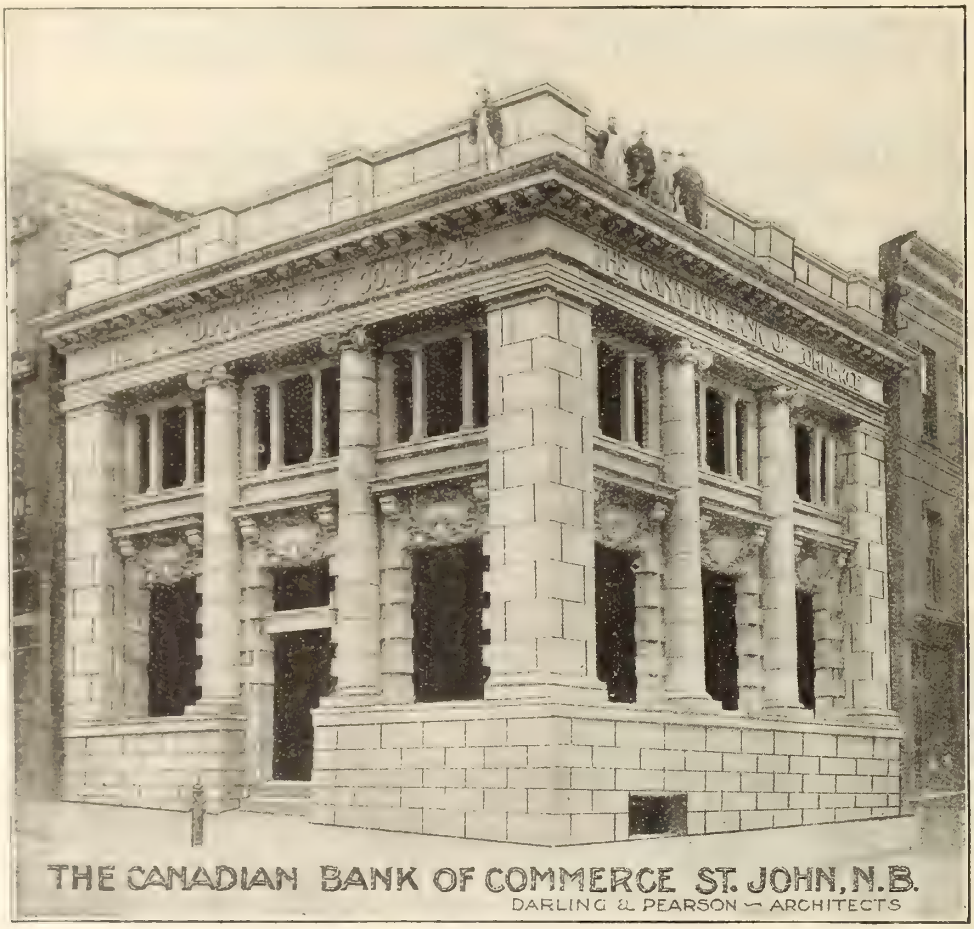

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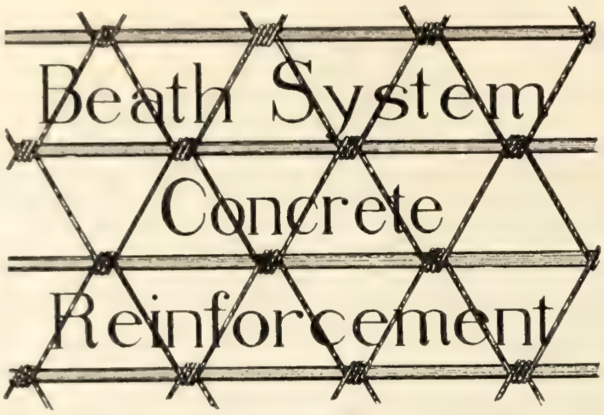

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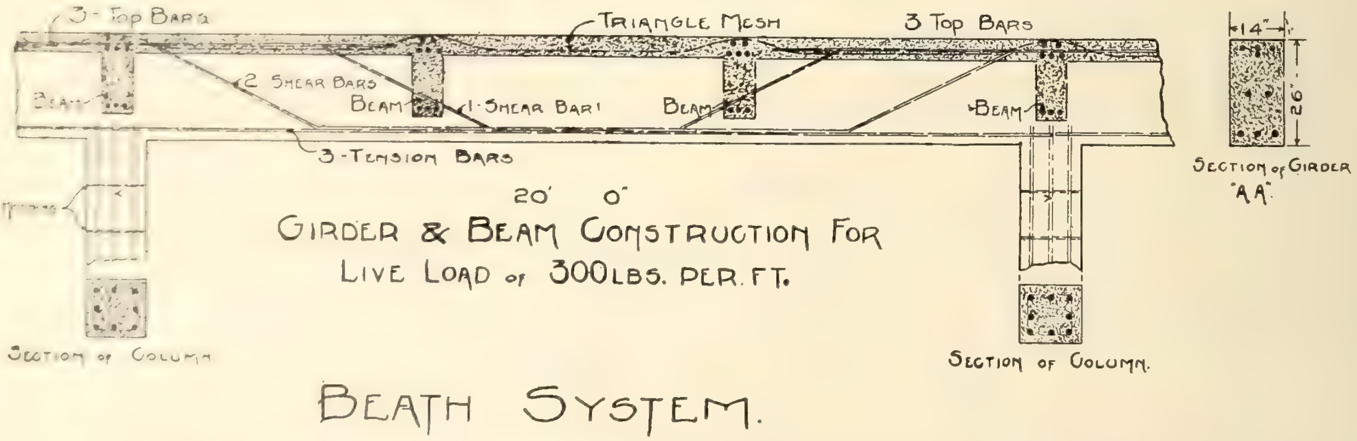

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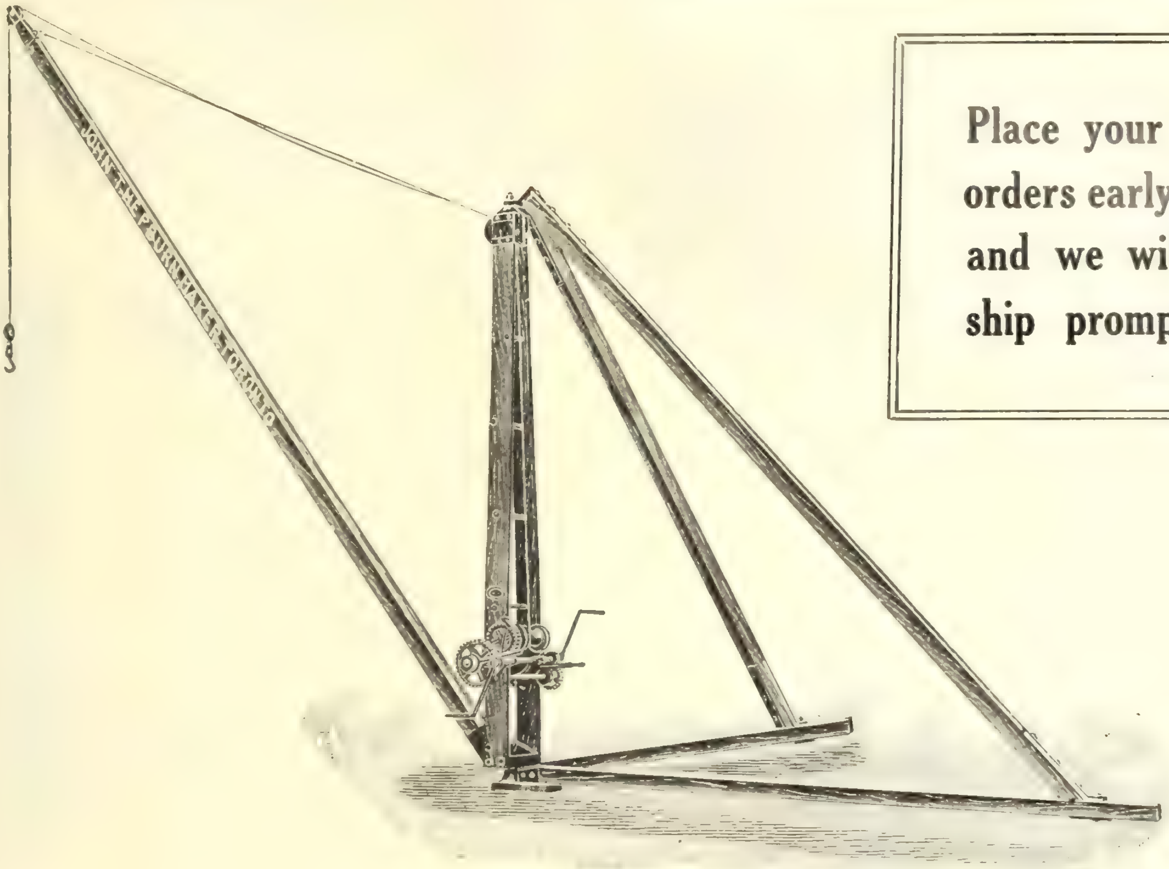
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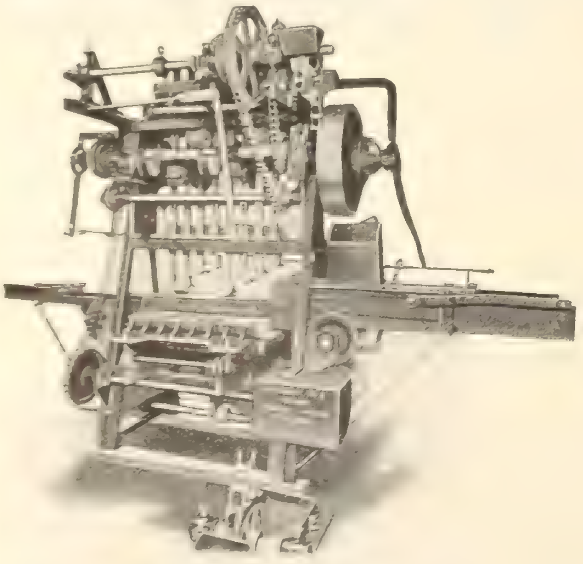
TWO SEWER PIPE FACTORIES : **St. Johns, P. Q. and New Glasgow, N. S.**

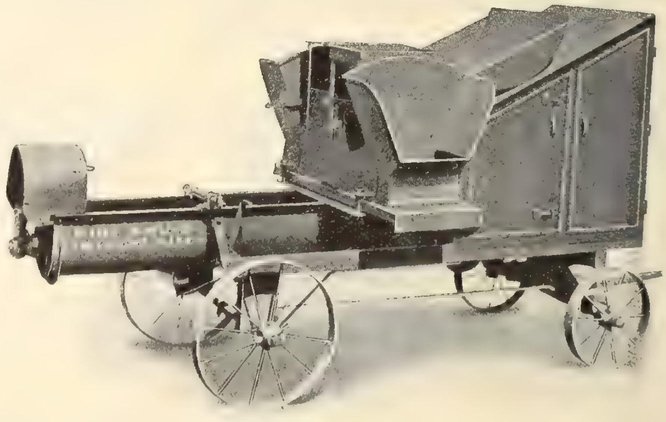
ALSO FIRE CLAY FACTORY AT ST. JOHNS, P. Q.

Cement Bricks

Here are the two Besser machines that make the best cement brick on the market. The Brick machine that will make 30,000 bricks per day—every brick the same.



Besser Power Cement Brick Machine



Besser Simplified Continuous Mixer

Woodstock Wind-Motor Co., Ltd.

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Copper Clad (Duplex Metal) Wire

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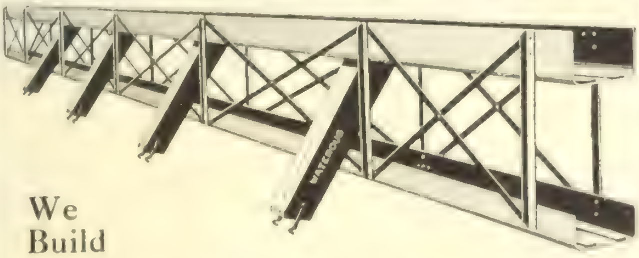

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Build

STEEL PLATE WORK -

We make a specialty of turning out Steel Plate Work that is *built right.*

A separate department of our modern boiler shop is kept busy on this work.

Send us your sketches for quotation. No matter how difficult, we have the men, the equipment and the experience to fill your orders promptly and satisfactorily.

We guarantee our workmanship. Our prices are reasonable.

Our List

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STEEL TANKS
STEEL STACKS
COAL AND ORE CHUTES
RIVETTED PIPE
ALL SPECIAL SHAPES

The Waterous Engine Works Co., Ltd.
BRANTFORD, CANADA

Anybody Can Make Money With This Mixer

Your men need no be past-masters in concrete to get the very finest results with the Oshkosh. Anyone can produce a smooth well-blended mix that is positively inspection-proof. We **guarantee** this. Has few parts and lasts a lifetime. Loads and cleans easily, mixes any material and requires little power. For a mixer that gives real satisfaction, by all means get the

OSHKOSH Mixer

Special Features. Quadruple or Four-Way Mixing Principle; that is, it turns, kneads, pours and flows four times to each drum revolution—efficient **Chain Drive**—Main Sprocket Drum Ring in sections; each instantly replaceable—**Discharge Lever** can be operated from all sides of mixer—**Combination Drive** and **Hoist**—heavy reinforced channel steel **Frame** thick semi-steel **Drum**—rotated on extra large rollers; can be stopped or started full or empty—all parts standardized and fitted to interchange in the field with ordinary tools. In every size demanded; standard or batch hopper or power charger; steam, gasoline or electric power. High grade gasoline engine with multiple disc clutch. Fine horizontal steam engine instead of a cheap vertical. Electric motor of latest approved pattern. **Rigid Guarantee** of absolute satisfaction.

Oshkosh Manufacturing Co.

120 S. Main St. Oshkosh, Wis.

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Canadian Jobbers and Agents Wanted in Unoccupied Territory.

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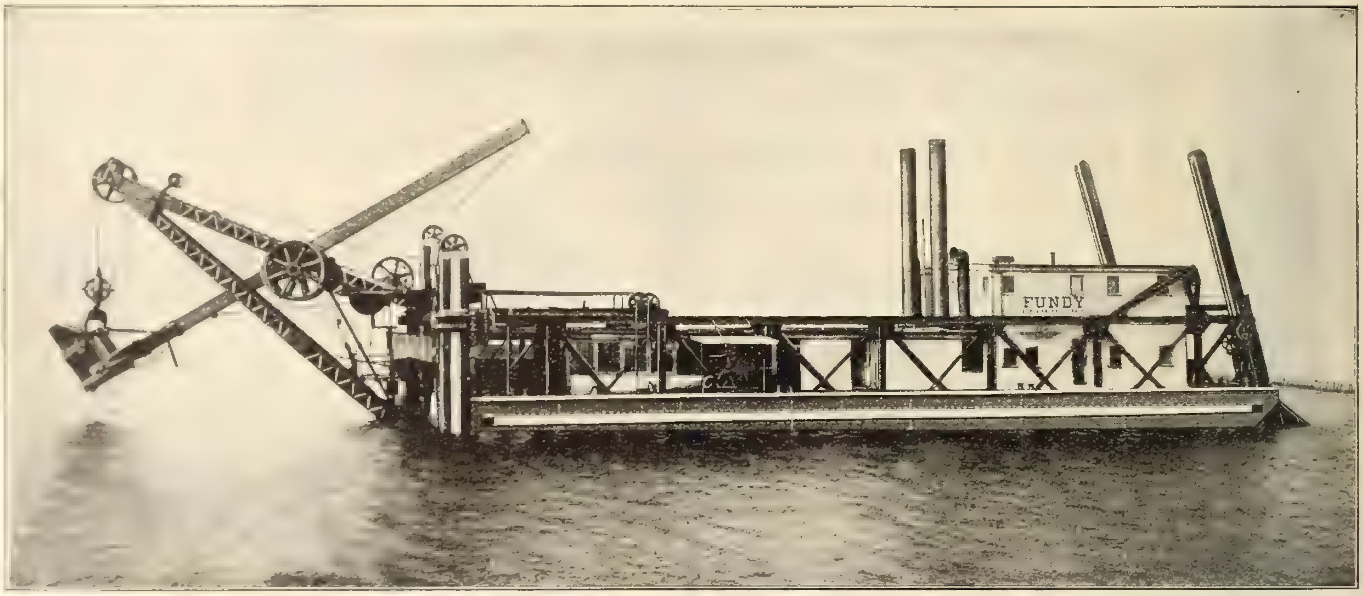
for Dredging, Railroad Construction, Harbor Improvement, Building Construction, Etc.



8 Cubic Yard Dipper Dredge working at Quebec, Que.

The amount of work in view this year is great and you will no doubt tender upon a goodly portion of it.

If the work you are figuring upon necessitates your buying an additional

Dredge, Steel Scow, Hoisting Engine, Steel Derrick, Clamshell Bucket or Pile Driver, Etc.

call upon us for prices EARLY.

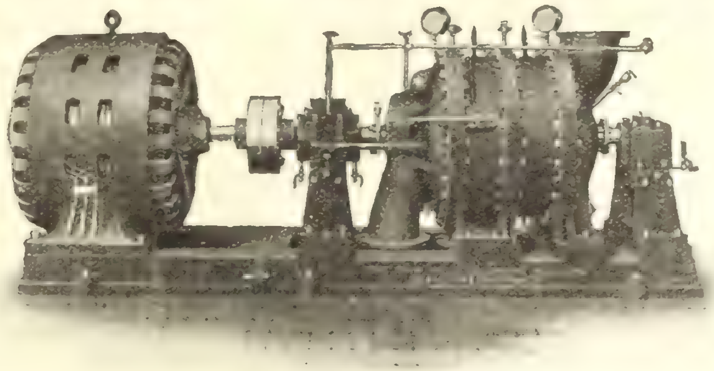
"The firm who get their plant on the ground soonest in the Spring, are very apt to clean up the larger profit on the season's work".

Write us today. We will give you immediate attention.

M. Beatty & Sons, Limited

Welland, Ontario

TURBINE PUMPS



"INGLIS" Turbine Pumps are Hydraulically self balanced and as an auxiliary a liberal water cooled marine thrust type bearing is used.

Send us your enquiries

The John Inglis Company, Limited

14 Strachan Avenue ENGINEERS AND BOILER MAKERS **Toronto, Canada**

McKiernan-Terry Core Drills

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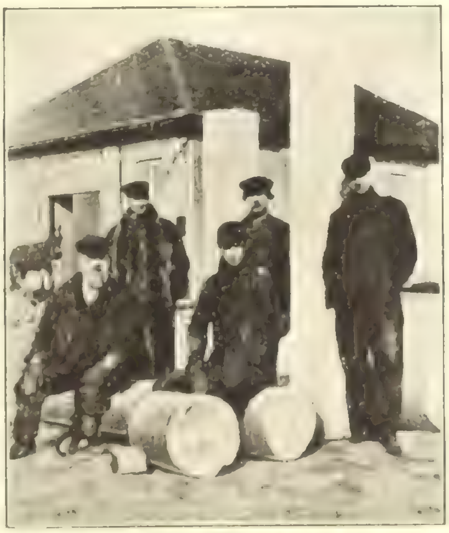

Ore Crushers

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Air Compressors

Steam Boilers

The 16 in. hard limestone cores shown above were taken out by one of our Type "C" McKiernan-Terry core drills, operated by the Corporation of Winnipeg.
This Drill is capable of boring any size holes up to 30 ins. in diameter.

Canada Foundry Co., Limited Head Office, Toronto

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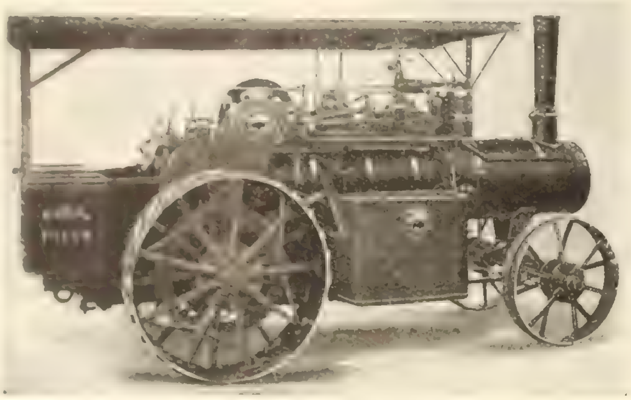
More Haulage Efficiency



Locomotive Features

ENGINE—Two sizes: 20 H.P., Brake Test 70 H. P.; and 26 H. P., Brake Test 100 H. P. Two road speeds, solid engine base, no strain on boiler.

GEARING—Every gear genuine open-hearth steel, warranted never to break. Enclosed in case to keep out dust and mud.

BOILER—Special high pressure; complies with every state or country law. Giving high tractive power with no excessive weight.

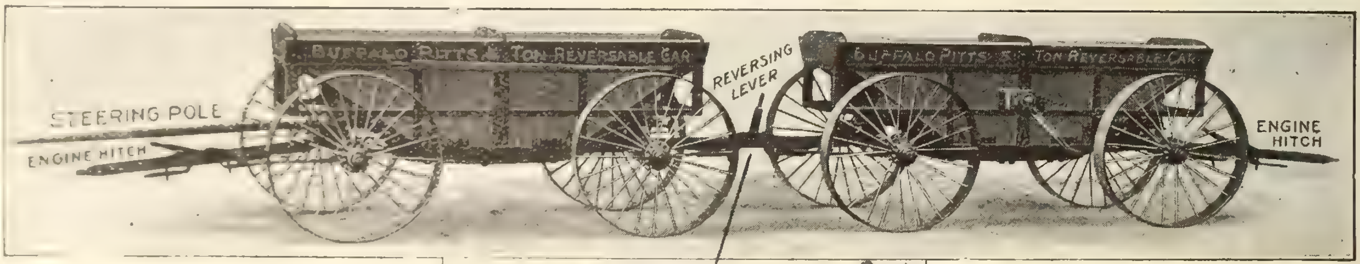
AXLES—High test drop forged.

TRACTION MOUNTING is so constructed on boiler extension that not a single bolt enters the water part of boiler.

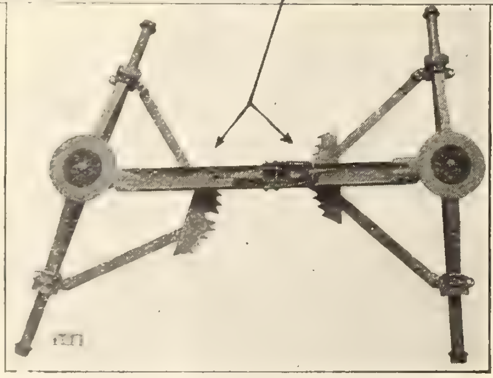
TRACTION WHEELS—Extra heavy steel with cleats that pull without cutting up finished road. Cleats tapered on inner edge to fit crown of road. Cleats are removable so the engine can be used for rolling if desired.

BUFFALO PITTS COMPANY

ROAD LOCOMOTIVES AND CARS


STEERING POLE
ENGINE HITCH
BUFFALO PITTS 5 TON REVERSABLE CAR
REVERSING LEVER
BUFFALO PITTS 5 TON REVERSABLE CAR
ENGINE HITCH

The only patent Reversible Gear of its kind, makes the car efficient in places where others are useless. So strong the train will not pull in two. So simple a boy can operate. The greatest time saver of the age.



By simply throwing the reversing lever on the connecting hitch the train can be **reversed** to move either forward or back around the sharpest curves as well as in a straight line. Absolutely the only device where this is possible.

A road car to be efficient must not only follow the tread of the locomotive accurately, but there must be a minimum of lost motion and ability to run forward or backward as desired.

3½ YDS PATENT REVERSIBLE CAR STONE SPREADING AND BOTTOM DUMP STYLES, 5-ton size. Forged Steel Frame, steel wheels with special bronze bushings, special steel axles. 54-inch wheels with 8-inch tires.

6½ to 8 YDS.—10-TON WOODEN FRAME CAR, same features of construction as described in 5-ton size.

6-TON PATENT REVERSIBLE FREIGHT CAR, CONVERTIBLE, equipped with different bodies for brick, cement, asphaltum, oil in barrels, pipe, timbers or any kind of material.

All Types of Buffalo Pitts Co. Cars can be coupled in the same Train. Write for Art Catalog and full particulars.

BUFFALO PITTS COMPANY

Haulage Outfits of Efficiency and Durability
Buffalo, N. Y.
Branch Houses and Agencies in All Leading Centers.

No. 110 R. I. W. DAMP RESISTING PAINT

Prevents
Cement
Mortar
Stains
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Excludes
Dampness

Preserves
Interior
and
Exterior
Surfaces
of Wooden
Tanks

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Protects
Steel from
Fumes of
Acids and
Alkalies

Bank of Toronto—Head Office, Toronto.
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THE R. I. W. DAMP-RESISTING PAINT CO.

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" Factory - 1372 Bathurst Street -

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Can. Equipment and Supply Co. Ltd., Calgary and Edmonton
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Black Building Supply Co., Ltd.

Northwestern Architectural Terra Cotta
High Grade Vitreous Face and Paving Bricks
Salt-glazed and Enamelled Bricks
R. I. W. Damp-resisting Paints
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G. & G. Telescopic Hoist
Utility Wall Board
Radial Brick Chimneys
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Standard Supply
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Philadelphia, Pa.

Gentlemen: —

We purchased from you a Chain Belt Concrete Mixer on April 18th, 1912. This concrete mixer has been in continual service up to the present writing and will say at no time has this machine caused us one minute's delay and I can thoroughly recommend this machine for thorough, efficient and prompt service to anyone who wishes, in my opinion, the best concrete mixer on the market.

Very truly yours,

Pier Realty & Holding Company

Samuel H. Headley
Supt. of General Construction

Mr. Headley is a contractor of prominence as might be supposed from the character of the work illustrated. His opinion is "worth while."

The Builder of the $500,000 Concrete Pier at Atlantic City Considers the

Chain Belt Mixer

"THE MIXER WITH THE BULGE."

The Best Concrete Mixer on the Market

THE mixer was placed in service on the pier project and how well it did the work is shown by the foregoing testimonial.

Work of this character is pretty good evidence of the capacity and efficiency of a concrete mixer. The pier in question extends more than a third of a mile out to sea. The construction, therefore, must be of the most substantial kind. The concrete must be of high grade and of uniform quality. The Chain Belt Mixer was the mixer selected to produce it.

The work must be rapid. The Chain Belt Mixer is one of the lighest-running and fastest machines built. It therefore met that requirement.

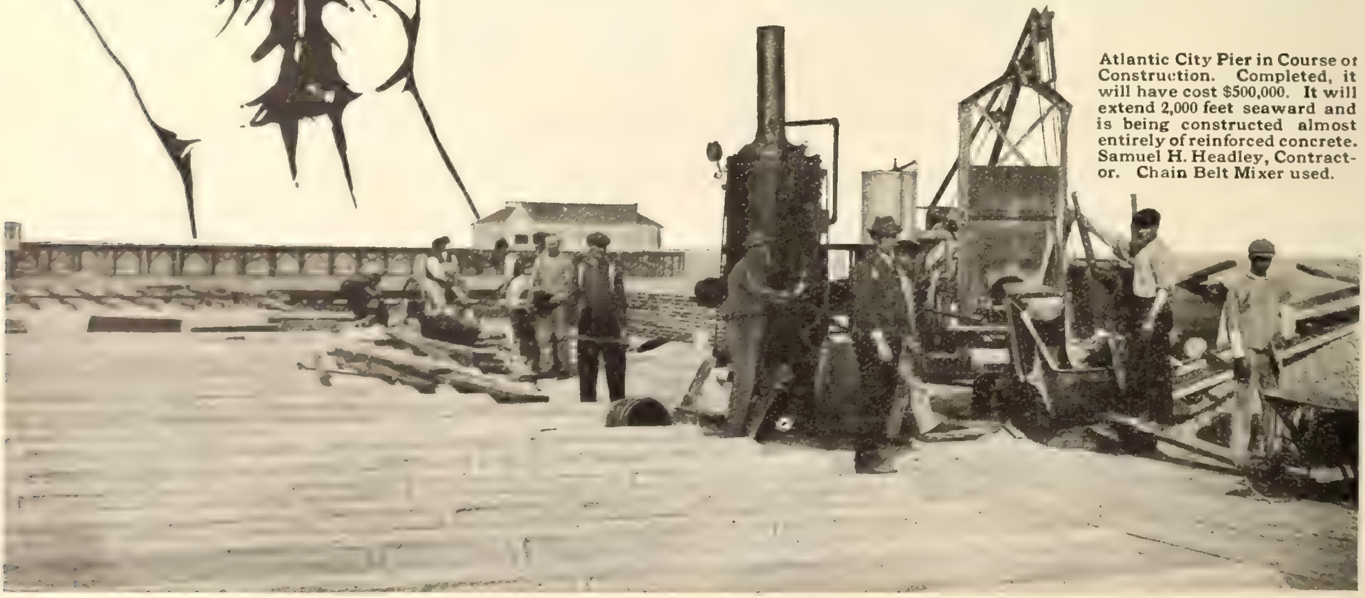
There must be no interruptions due to breakdowns, etc. Chain Belt Drive and the Chain Belt Mixer constructions generally are the best possible assurance against breakdowns and loss of time. Hence, the Chain Belt selection on those grounds.

The season will be in full swing almost before you know it. Better order that Chain Belt Mixer now. What size do you require?

CHAIN BELT COMPANY

MILWAUKEE, WISCONSIN

Dominion Equipment & Supply Company,
Winnipeg, Manitoba, and Vancouver, B. C.



Atlantic City Pier in Course of Construction. Completed, it will have cost $500,000. It will extend 2,000 feet seaward and is being constructed almost entirely of reinforced concrete. Samuel H. Headley, Contractor. Chain Belt Mixer used.

A Belt Which Conveys ALL the Power

Practical men know the drainage of power from a slipping belt, ***and because they know,*** they are buying

GOODYEAR RUBBER BELTING

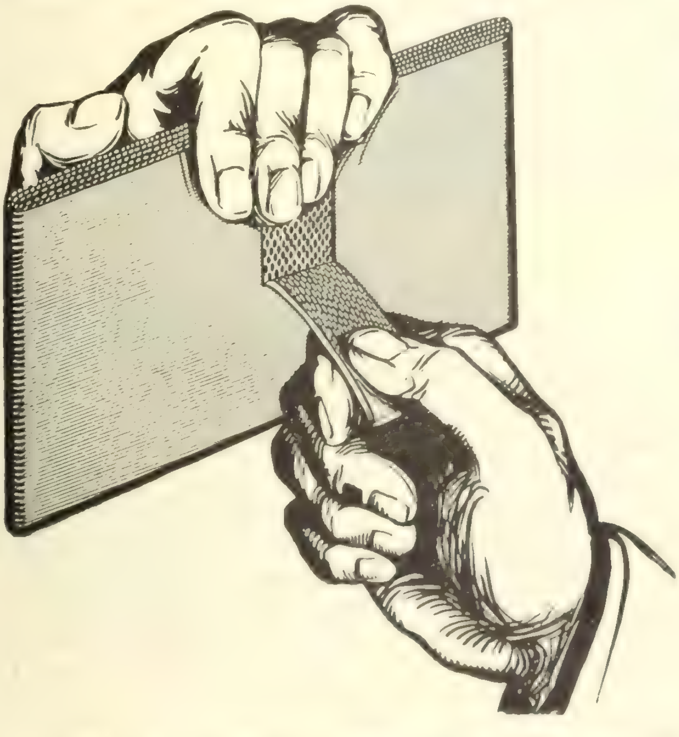
Which Neither Slips Nor Stretches

It is built up, layer upon layer, of close-woven, long-fibre, cotton fabric, rubberized and cured under Goodyear processes. And every Goodyear belt has in it the lowest possible minimum of stretch, because the belt is "cured" whilst stretched to the limit of safety in a special machine.

That is the Goodyear Method of Belt Manufacture

And the result is entirely satisfactory to belt users—a fact to which our enormously increased sales testify. What is the significance of this CONTINUED SALES INCREASE—50% over last year? Simply that Goodyear Belting more than fulfills the claims made for it by the Goodyear people—who know what a belt should do, and make a belt to do it.

It has cost us less than $200.00 for claims or adjustment of every kind in connection with our total output for the past two years—a remarkable tribute to Goodyear reliability.



Look into the Belt for Yourself—Try to Tear it Apart.

Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

That is the result of forcing rubber at a tremendous pressure through the fine cotton fabric—separating every strand—thus abolishing all internal friction or grinding. Whilst these layers of fabric are afterwards so compressed as to be almost homogeneous, the finished belt bends easily, the "duck" being so woven as to retain complete pliability in the finished belt.

For Main Drives and High Speed Pulleys GOODYEAR Belting is the Best

It has all the tensile strength necessary to absorb tremendous strain without slip, stretch or rent. The grip of rubber and the prodigious strength of hard twist cotton fabric are united, and prove equal to every emergency.

Where the power transmitted is high, and great tensile strength is essential, Goodyear Rubber Belting proves its worth.

EVERY GOODYEAR BELT IS SUBJECTED TO A STRINGENT TEST BEFORE LEAVING THE FACTORY, and what is more, the materials used in the manufacture are also tested in the Goodyear laboratory before using.

IF YOU USE A BELT AT ALL IT WILL PAY YOU TO USE A GOODYEAR

Loss of power is loss of profit—and an inferior belt is dropping power all the time. Goodyear belting quickly earns its cost in power saved and trouble avoided.

TWO HUNDRED AND FORTY ROLLS—A TOTAL OF 72,000 FEET

We have just received an order for this quantity of GOODYEAR RUBBER BELTING from one business concern in the west, for the equipment of interior elevators—such an order [illegible] confidence in the quality of GOODYEAR Belting.

If we have not just the belt you require we will make it for you.

In the choosing of belts our booklet would be of great assistance to you. We supply it free. Write to our nearest branch for one.

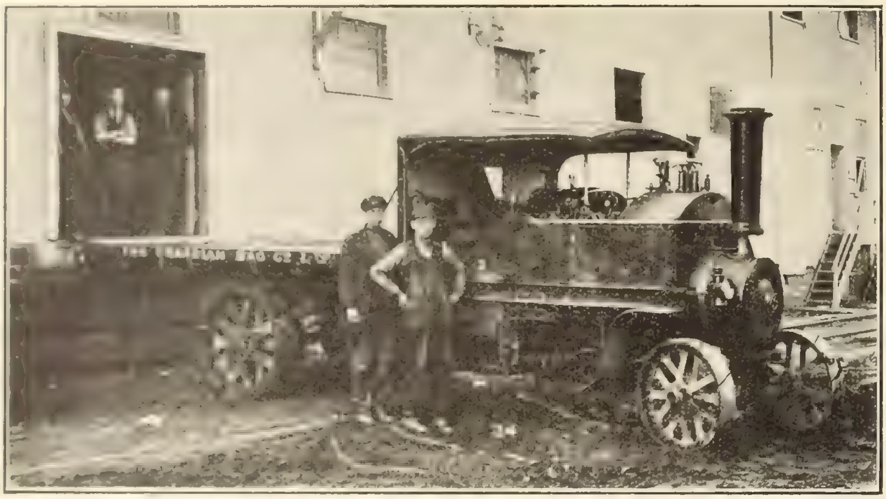
The Goodyear Tire and Rubber Company of Canada, Limited

Factory, Bowmanville, Canada

BRANCHES: Victoria, B. C. Vancouver, B. C. Calgary, Alta. Regina, Sask. Winnipeg, Man. London, Ont.
Hamilton, Ont. Toronto, Ont. Montreal, Que. St. John, N. B.

Foden Patent Steam Truck

The most up-to-date, economical and reliable method of hauling Brick, Sand, Stone, Structural Steel, etc. up hills and over rough roads.



Various types of bodies may be fitted to trucks to suit conditions

"Foden" 6 ton trucks at work in Montreal.

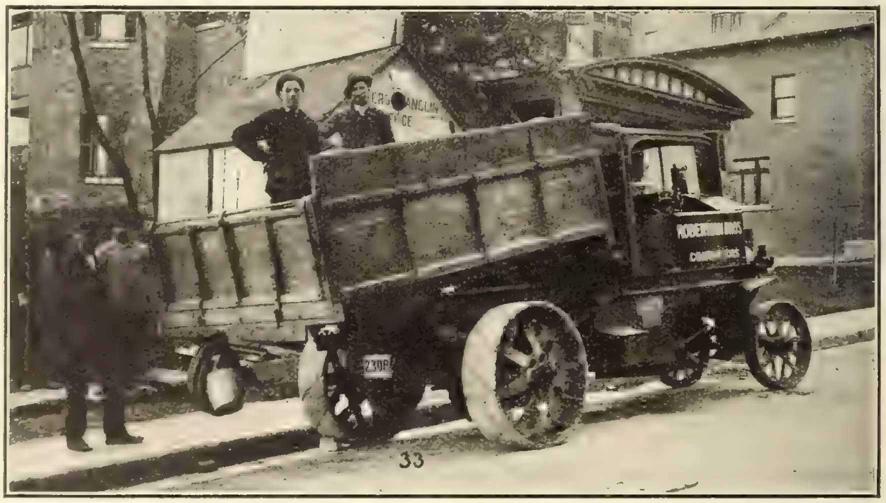
The upper cut illustrates a Lorry type and the lower a Tipper.

Note inexpensive steel tyres 12″-14″ face.

20 sold in Canada last year and **21** at present on order including repeat orders.

Independent of gasoline which is soaring in price; dependent only on **Coal or Coke, and Water.**

We stock repair parts.



Unloading face-brick by hand—Box partly dumped. For unloading ordinary brick, stone, sand, etc., box may be fully dumped, mechanically

Fodens Ltd. are the oldest and largest manufacturers of Steam Trucks in the world.

We have Foden Trucks now running in Montreal, Toronto, Winnipeg and Vancouver.

Write for Catalogue and particulars, and to insure Prompt Delivery, Order Early.

Jones & Glassco, Montreal

Canadian Agents **Registered Engineers**

PORTLAND

CEMENT

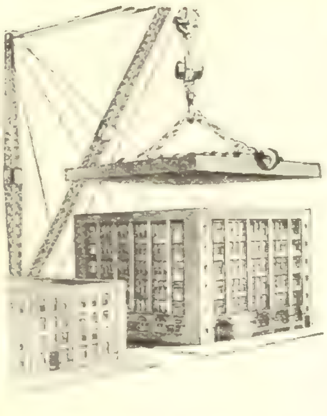
CRUSHED

STONE

The Rogers Supply Co.
28 King St. West
Toronto
Telephone Main 4155

G. T. R. and C. P. R. Delivery
6 Supply Yards

Prompt Service



SUPPOSE A ROOF WERE A SLAB OF STONE!

You wouldn't think of putting coating or gravel on it to waterproof and preserve it.

You wouldn't worry about its rotting, rusting, drying out, melting or deteriorating in any way.

And you wouldn't be alarmed if sparks or burning embers from a fire next door fell on that roof.

J-M Asbestos roofing is practically such a stone roofing. It consists of layer on layer of Asbestos (stone) Felt securely cemented together with Trinidad Lake Asphalt—two indestructible minerals.

J-M ASBESTOS ROOFING

is practically indestructible. This is proven by the fact that it is still in good condition on many buildings where it has been in service for more than a quarter-century without coating, graveling or repairs.

Half a century of roofing experience and our positive guarantee of satisfaction are behind J-M Asbestos Roofing.

This roofing is suitable for all kinds of buildings in any climate. Your dealer sells J-M Asbestos Roofing—if not, send your order to our nearest branch.

We want to send you a sample of the odd rock from which this roofing is made. Simply write our nearest house on a postal and ask for a piece of crude Asbestos and catalog No. 303

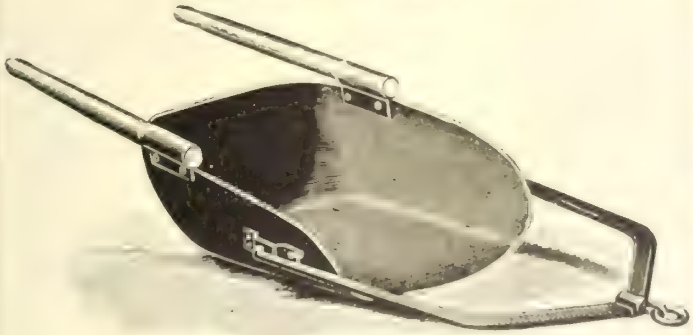
THE CANADIAN
H. W. JOHNS-MANVILLE CO., LIMITED

Manufacturers of Asbestos and Magnesia Products
ASBESTOS
Asbestos Roofings, Packings, Electrical Supplies, Etc.

TORONTO MONTREAL WINNIPEG VANCOUVER

1578

IRON AGE



CONTRACTORS' IMPLEMENTS

As makers of the high grade Iron Age [illegible] solicit your trade in the following lines:

DRAG AND WHEEL SCRAPERS—
Each Drag Scraper is pressed from a solid sheet of high-carbon steel no joints or seams. Our Wheel Scrapers have all the latest dumping attachments and are supplied with [illegible] of standard capacity.

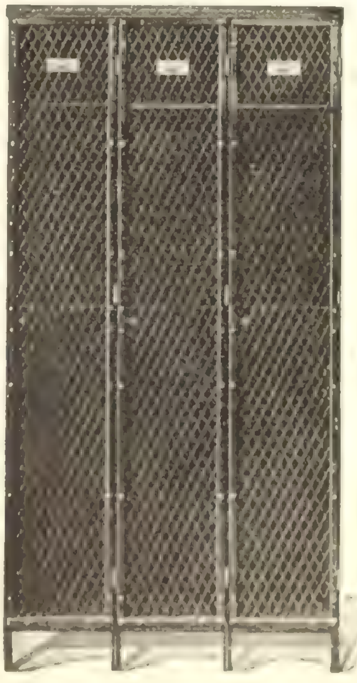
STEEL TRAY BARROWS—
The trays are pressed from a solid sheet of high-carbon steel and the edges are turned over. Fitted with heavy steel wheels, [illegible] construction is thoroughly substantial.

PICK AND ROOTER PLOUGHS—
Nothing to break, bend, or get out of repair. Ten horses can be used without straining the parts.

Write us for catalogues

THE BATEMAN-WILKINSON CO., LIMITED
340 CAMPBELL AVE., TORONTO

GET AWAY



from the old style wooden lockers and use **Meadows' Metal Lockers.** Their construction is rigid and embodies a number of original features not found in other makes worthy of your consideration.

Send for our illustrated booklet entitled
"Locker Lore"

GEO. B. MEADOWS
Toronto Wire, Iron and Brass Works Co. Limited
TORONTO, CANADA

Building Supplies and Engineering Specialties

We specialize on the following:

- Gray Silica Face Brick and Glazed Brick.
- Esco Steel Protective Paints.
- Ceresit Waterproofing Compounds.
- De Lavergne Artificial Ice Plants.
- Keystone Gypsum Blocks.
- Nelson Bronze, Iron and Steel Valves.
- Terra Cotta and Faience.
- Feed Water Filters and Grease Extractors.

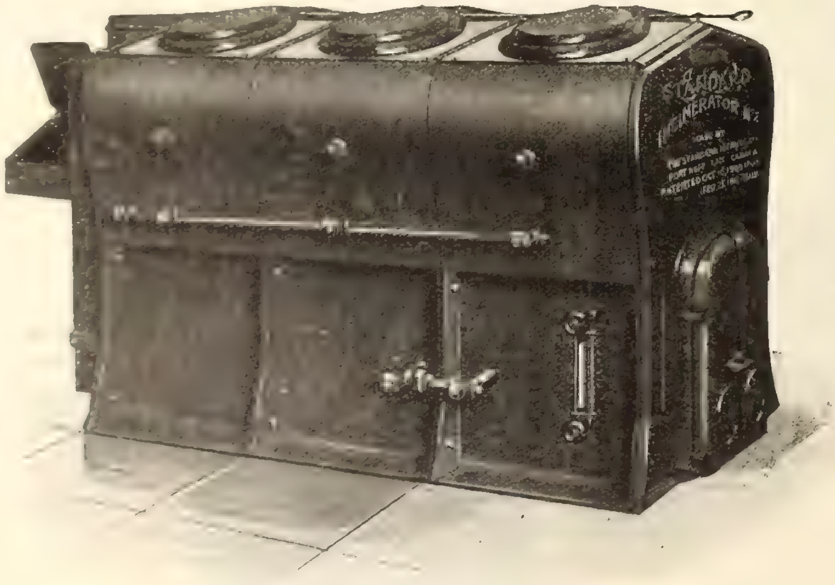
Get Our Prices

- Reliance Ball Bearing Door Hangers.
- Sturtevant Ventilating Sets and Blowers.
- Sky Lights and Metal Windows.
- Steel and Kalameined Doors.
- Custodis Radial Brick Chimneys.
- Taylor Gravity Underfeed Stokers.
- "Pen Dar" Metal Lockers.

Write us for quotations

Douglas-Milligan, Limited

Builders' Supplies and Engineering Specialties
304 University Street, Montreal. Toronto, Confederation Life Building.



Three Section Incinerator—Type No. 2

Sewage and Garbage Incinerators

In Standard Ideal Incinerators the accumulation of the matter—both solid and liquid—is absolutely sanitary and non-infectious. The system of Incineration is complete—the solid matter being reduced to a small ash and the liquids completely evaporated.

It is important to note that in the latter process the system of drafts is arranged so that the fumes and vapors arising from the accumulation must pass through the fire before reaching the open air. This obviates all obnoxious odours.

The United States Government finally selected this type for the disposal of toilet refuse in its military camps and elsewhere, after trying every other apparatus on the market.

Standard Ideal Incinerators are made in two types:

TYPE No. 1 is intended for the use of 10 persons daily.

TYPE No. 2 is sectional; one section alone having a capacity for 25 persons daily. The addition of extra sections increases their capacity proportionately.

Write for booklet
"INCINERATION AND INCINERATORS.

The Standard Ideal Company Ltd.

PORT HOPE, ONTARIO

Branches: WINNIPEG TORONTO MONTREAL VANCOUVER

ESTABLISHED 1886

Contract Record and Engineering Review

PUBLISHED EACH WEDNESDAY BY

HUGH C. MacLEAN, LIMITED

HUGH C. MacLEAN, Winnipeg, President.
THOMAS S. YOUNG, General Manager.

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SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
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Alphabetical Index of Advertisers
Page 16

Vol. 28 **March 19, 1913** **No. 12**

Accuracy in Estimating

THE qualifications and duties of an engineer are many and varied, but there are none more important than accuracy in estimating. Upon his ability in this direction advancement comes to him, for he is dependent not merely upon the opinions of superior officers in his own profession, but upon the judgment of laymen. In technical matters of engineering skill the commendations of the engineer's colleagues and superiors are of no small value to him, but upon them the layman is not in a position to form a competent judgment. Hence whilst his energy, zeal, and business management may be all details of considerable consequence, yet these to the laymen are to some extent intangible qualities, and largely a matter of opinion. Not so the accurate preparation of estimates, however, for here is a test of professional knowledge in a definite direction which the layman and public generally can gauge, and often the reputation of the engineer has to stand or fall by it.

Excess expenditure over estimates in the case of productive public works is of great moment. Possibly the only reason for deciding to embark upon them is the prospective productiveness, and if the excess expenditure is much above the estimate then the whole justification for commencing the work falls to the ground. Then the layman and the press voice their indignation. It is obvious, therefore, that the correctness of the expenditure figure is of supreme importance, and no engineer with any respect for his reputation will deal with the matter without the most serious consideration. If he is to be a good business man he will realize that estimating is work very intimately connected with the conduct of business, and upon the accuracy of his estimates his own professional standing will greatly depend.

We know that excesses over the amount of sanctioned estimates are of frequent occurrence. They are lamentable on account of the heartburning caused to the sanctioning authority who approved the estimate on a certain definite assumption, and on account of the difficulty invariably experienced in locating the blame. The excess may have been entirely avoidable, or in some cases it may have been unavoidable for reasons which could not possibly have been foreseen, but between the two main instances the dividing line is liable to be very narrow and possibilities of injustice very easy. The engineer who prepared the estimate may not be the engineer who carried out the work; they may both have been to blame, or one or the other, or neither, or the excess may have been due to alterations by a committee chairman who usurped more power than that to which he was entitled, and who demanded alterations or additions while the work was in progress, with the usual results. But wherever the responsibility should rest, it is certain that the engineer will suffer in the long run. Hence the necessity for the estimator's becoming as expert as possible. He may fail in some degree, but the more consistently he strives to attain perfection the more nearly will his efforts mean success.

* * *

There is an important tendency in recent construction to go back to the greater use of wrought iron as compared with steel. This tendency was referred to recently in two papers, one read before the West of Scotland Iron and Steel Institute and the other later at the Staffordshire Iron and Steel Institute by Mr. H. Pilkington, M. Inst. C.E., and most of the speakers agreed that this revival has been very conspicuous. The author of the latter paper referred to the fact that in the United States the reversion to iron was on a considerable scale. In Pennsylvania alone there are now fifty-three iron mills in existence and probably 200 in the States. This he attributed largely to the prevalence of rail breakages, as well as to piping and segregation. These were defects which could not possibly obtain in wrought iron. Lamination troubles, it was true, were frequent enough in the days of iron rails rolled from piles, but if rails ever had again to be rolled from iron, piling would be an obselete institution. It is well known that because of the excessive corrosion which British railway companies have discovered in mild steel they had now largely come to the conclusion that with regard to the rolling stock they must revert to iron, sacrificing superior strength to other considerations. There was also a marked preference shown in the demands from the Over-seas Dominions for galvanized sheets of iron instead of steel, owing to the greatly lessened liability of the former to corrosion.

* * *

To foster a broader commercial spirit between America and Germany, about two hundred of the most prominent mechanical engineers of the United States will go to Europe this summer to attend the 54th annual meeting of the Verein deutscher Ingenieure in Leipzig and to inspect the educational and industrial establishments of Germany. The party will sail on June 10 on the Hamburg-American line S.S. Victoria Luise, the largest and most superbly appointed cruising steamer afloat. Many friends of the engineers are also planning to sail on the steamer and will probably compose the entire passenger list. The official party will consist of two hundred members of the American Society of Mechanical Engineers, accompanied by one hundred ladies. The programme will include many features of interest, including a tour of industrial Germany, including Dresden, Berlin, Cologne, Dusseldorf, Frankfurt, Heidelberg and Munich.

Up-to-date Building Methods at Toronto

ONE of the many large buildings which will be erected in Toronto this season is the Ryrie Building, at the corner of Shuter and Yonge streets. Immediately north of the site which is being cleared is a large building which is to be incorporated with the new one. The alterations necessary to make this connection have been going on for some time, the work being carried on with one store vacant on the ground floor and basement, and the other part of the building being occupied by a wallpaper business carrying a large stock of paper on each floor.

As the old columns carrying the floors of this building were not of sufficient capacity they were removed, and new ones inserted with much larger foundations. This necessitated shoring. New columns were erected, and new steel beams were provided to take the joists, which were then encased with concrete. In the south wall, large columns extending from below the basement floor up to the second floor joists were inserted to be used in connection with the steel-work of the new building, these being covered in with masonry. Openings were cut, windows put in, and lintels inserted for future openings. The whole of the store is now being repaired for the occupation of the tenant, who will be able to remain and occupy the premises without any further disturbance during the completion of the block. This important part of the building operation was in charge of Messrs. T. Cannon & Son, Limited, under the direct supervision of Mr. T. Cannon, Sr.

Practically nothing was seen or heard which would indicate the progress of such work and the successful completion reflects credit on those in charge.

Unit Cost Data on Bridge Materials

In a paper before the last convention of N. A. C. U., James W. Phillips, Assistant Engineer Department of Public Works, Philadelphia, describes the work of eliminating grade crossings in Philadelphia. This work involved the construction of two concrete arch bridges and 20 steel bridges with concrete floors. The work required 151,800 cu. yds. of concrete masonry, and 231,800 barrels of cement were used.

The following table gives the average unit prices of some of the important materials used in the work, except waterproofing:

1st class masonry, concrete backing	$9.50 per cu. yd.
1st class masonry, 3rd class backing	$8.14 per cu. yd.
2nd class masonry, 3rd class backing	$7.42 per cu. yd.
3rd class masonry, above neat lines	$5.71 per cu. yd.
3rd class masonry, in foundations	$5.43 per cu. yd.
1st class arch masonry	$11.25 per cu. yd.
1:2:4 concrete arch masonry	$7.95 per yd.
1:3:6 concrete copings	$7.54 per cu. yd.
1:3:6 concrete masonry (1½ in. stone)	$6.45 per cu. yd.
1:3:6 concrete bridge (¾-in. stone)	$6.45 per cu. yd.

Making pipe connections under pressure was accomplished on the 36-inch main of the Kedzie Avenue tunnel in Chicago. At the intermediate shaft of the tunnel an 8-inch connection was made to the 36-inch main while the latter was under pressure and with about 30 feet of water in the shaft. A special form of the Chicago sleeve and nipple was made, with a saddle to carry the weight of the standpipe. According to the engineer's report of the Department of Public Works of Chicago, this nipple, with the valve and cutting machine attached, was lowered into place by the city diver, who also directed the feeding of the cutting machine, while the power for operating the cutter was applied from the surface. In this way the connection was quickly made at a cost of $785.80 for labor and material. It is stated that any other method would have necessitated a considerable increase in cost.

Street Retaining Wall at Vancouver

A retaining wall for a street fill was built during 1912 by the city of Vancouver which is unique in its general plan, so far as we are aware. A street was to be carried across a rather deep ravine, where the fill was considerably more than 12 feet deep for some distance, and where it was desired to carry the top of the fill to the full width of the roadway. The fill was confined by a wall along each side which was constructed of a concrete, but which, instead of being solid to a foundation on or beneath the ground surface, was continuous for a depth of only about 12 feet, at which depth it rested upon a series of arches. The fill, consequently, spread through the arches and assumed its natural slope below the 12 foot depth; but since it was confined for the upper 12 feet, there was saved by the wall a volume of fill equal to approximately 36 feet multiplied by the entire depth of fill less 6 feet. As the thickness of the wall below the 12 foot depth would have been considerable, there was a very great saving in the cost of concrete required over what would be necessary were the wall carried down to the ground surface. The wall was constructed entirely on private property so that it can be used by the owner of the property as a foundation for a building when such may be erected, and by constructing the solid wall to a depth of 12 feet, a good basement is assured without having to remove any of the earth fill, the present wall acting as the front wall of the basement.

Plans have been completed for a new Presbyterian church, the members of the Stanley Street Church having decided to remove to a new building, at the corner of Westmount and Victoria Avenues, Westmount. The new church will be cruciform in structure, built in the Lombardic style. It will be surmounted by a dome, and the interior will be arched and domed. The building will have a frontage on Westmount avenue of 90 feet and will have a depth of 192 feet. The auditorium will seat eight hundred persons, while with the galleries, which it is intended to place at the back of the church, the total capacity will be about 1,200. In the rear of the church itself and with a frontage on Victoria avenue, there will be a large Sunday school with accommodation for five hundred. There will be a banquetting hall in the basement, while a study for the pastor, and various other rooms, will also be provided. The big school will be divided up into twenty-two class rooms. The partitions, however, will be so constructed that they will fold up against the walls, thus transforming the school into an auditorium, which can be used for concerts.

The St. Laurent Brick Company, Laprairie, Que., have decided to double the output of their plant at a cost of $250,000.

VANCOUVER

The constructional history of a city of spectacular development—a city that is progressing, literally, "by leaps and bounds." Facts and figures that are romantic, yet wonderfully significant, in their interest. The more important building and engineering enterprises of recent date described in detail.

COMPARED with eastern cities that celebrate tercentenaries and the like, Vancouver has no history. So far as is recorded, no white man made his way to the neighborhood of Vancouver until the year 1793. In the spring of that year, Captain George Vancouver, having received orders from the British Admiralty to find out whether the Strait of Juan de Fuca was really a strait, undertook to examine and survey the Coast. Pursuing his task, Vancouver came on June 13th to a point which in honor of his friend, Capt. Grey, of the Royal Navy, he named Point Grey. The same day he passed through the First Narrows, and entered the Inlet, which in compliment to Sir Harry Burrard, also of the Navy, he called Burrard's Canal. Vancouver and his party proceeded to explore the Inlet, and next morning they departed.

Seventy years went by, and Burrard Inlet remained almost as Vancouver had left it. The gold rush to the Fraser came, but prospector and trader passed in through the New Westminster gates, and Burrard Inlet was left to the little colony of Indians that gathered on the north shore. In 1859 a party came in seeking coal, and sank some shafts on the south side of the Inlet. They left the name, "Coal Harbor" and carried their tools and tents elsewhere. In 1865 the Hastings Sawmill was established where it stands to-day—on the waterfront near the foot of Dunlevy avenue. It employed a large number of workmen, and as years passed by a little town developed to the west of the mill, on a site surveyed by order of Sir James Douglas.

The early history of Vancouver is inextricably inter-woven with the early history of the Canadian Pacific Railroad in Vancouver, which dates from the year 1886. British Columbia had entered Confederation in 1871, and one of the terms of the agreement then signed, was that a railroad should be built connecting it with the other Canadian provinces. At first it was intended to have the line cross the gulf to Vancouver Island, and it was not until 1879 that this plan was abandoned and Port Moody at the head of Burrard Inlet was selected as the western terminus of the line. The Dominion Government built the line from Kamloops Lake (Savona, B.C.), and gave it to the Canadian Pacific as part of its subsidy. The Provincial Government having large holdings of land at Point Grey, Port Atkinson, North Vancouver, etc., was naturally anxious to get the line extended to Coal Harbor and English Bay. The people of Vancouver—few, but full of civic patriotism—were as naturally anxious to gain the same end. The C.P.R. hampered by the lack of yardroom at Port Moody and the fact that the company did not own an acre outside that limited yard, was also eager to extend its line. The result was inevitable. The Provincial Government agreed to give the railway the whole of Lot 541—which is at present the business centre of Vancouver—and Lot 526, which to-day includes the residential section of Shaughnessy Heights.

The owners of Lots 181, 196 and 185, not to be outdone in generosity, gave the railway company all their

Hastings Street, Vancouver, in 1889

First meeting of Vancouver city council after fire of 1886

waterfront on Coal Harbor, and one-third of the town lots when they had been sub-divided. From Stanley Park to Gore avenue the waterfront passed into the hands of the Canadian Pacific, and not one street reached through to the water on city property. Later, the city went into the courts to decide the rights of the two parties, and the city lost.

The city of Vancouver was incorporated in April, 1886. A few months later in the same year it was totally destroyed by fire. The first meeting of the City Council after the fire was held in a tent pitched on a burned-over lot. A photographer fortunately has preserved a picture of that historic session. There has been no city hall up to this time, a room in an hotel doing duty as a council chamber. A portion of the old wooden building on Powell street, now used as a sort of municipal storehouse, was erected in the summer of 1886 and did duty as a civic building for many years. The first city council of Vancouver had a hard road to hoe. It was difficult to get money for improvements. The town was without assets and capitalists were reluctant to advance funds.

Growth of Population

At the close of 1890 there were 12,000 people in the city, and two years later 15,000. Then followed a period of depression which lasted several years. It was a trying time, but the city plodded doggedly along —population increased steadily and improvements continued to be made. It was not, however, until 1904 that the present period of prosperity set in. In that year the Great Northern Railroad entered the city, and Vancouver from that fact alone received an immense amount of advertising. The city had been given its first start by the Canadian Pacific. It received its second from a rival railroad. Greater Vancouver is not more than eight years old, and the larger portion of it is even more youthful. The following figures show at a glance the marvellous increase of population during recent years:—1904, 38,414; 1906, 52,000; 1908, 66,500; 1910, 93,700; 1913, 140,000.

Assessment Growth

The following table shows in an interesting way the growth of assessment in Vancouver, the valuation being at the beginning of the year:

Year	Real Property	Improvements	Total Assessable Property
1887	$ 2,456,842.00	$ 182,235.00	$ 2,639,077.00
1889	5,275,596.00	730,027.00	6,005,623.00
1891	10,477,420.00	1,501,655.00	11,979,085.00
1893	16,032,744.00	2,832,960.00	18,865,704.00
1895	13,829,724.00	4,317,660.00	18,147,384.00
1897	13,000,869.00	4,441,490.00	17,442,359.00
1899	12,705,099.00	5,011,190.00	17,716,289.00
1901	12,792,530.00	7,440,600.00	20,233,130.00
1903	13,845,565.00	9,091,270.00	22,936,835.00
1905	16,739,640.00	11,804,250.00	28,543,890.00
1907	38,346,335.00	16,381,475.00	54,727,810.00
1909	48,281,330.00	24,405,210.00	72,686,540.00
1910	76,927,720.00	29,644,755.00	106,572,475.00
1911	98,720,345.00	37,858,260.00	136,579,005.00
1912	138,557,595.00	53,515,295.00	192,072,890.00

BUILDING PROGRESS AT VANCOUVER

Of the many remarkable developments of the Western portion of the Dominion of Canada, there is none more phenomenal than the rapid and substantial growth of Vancouver's building operations. On the 12th day of 1900 the first building by-laws was passed, requiring the erection of buildings within certain specified areas, and appointing the first building inspector, Mr. George McSpadden. The first year that a complete record was kept of the amount of building done, was in 1902. The total for that year was $833,607. During the past four years any single month which did not exceed the amount for the whole of 1902 has been much below the average.

General view of English Bay, Vancouver

During the eight years from 1902 to 1910 there was a steady increase from less than one million in 1902 to thirteen millions in 1910. The following year went four and a half millions better, bringing the total value of buildings up to over seventeen and a half millions for 1911. The total value of permits issued during the year 1912 amounted to $19,500,000.

Large as these figures may appear, they do not show the true value except by comparison. Up to April, 1911, the total area of the city was only eight square miles. Since that date Hastings Townsite and District Lot 301 have been added, making the total area approximately 16.89 square miles. Compare this with the area of other cities of the Pacific Coast and some idea of the phenomenal growth of Vancouver may be obtained. Los Angeles has 92 square miles, Seattle 57 square miles, each of these cities having a larger area than Vancouver and South Vancouver combined. During the last three years there has been about three million dollars worth of building a year in close proximity to the city proper, which must be excluded from the returns.

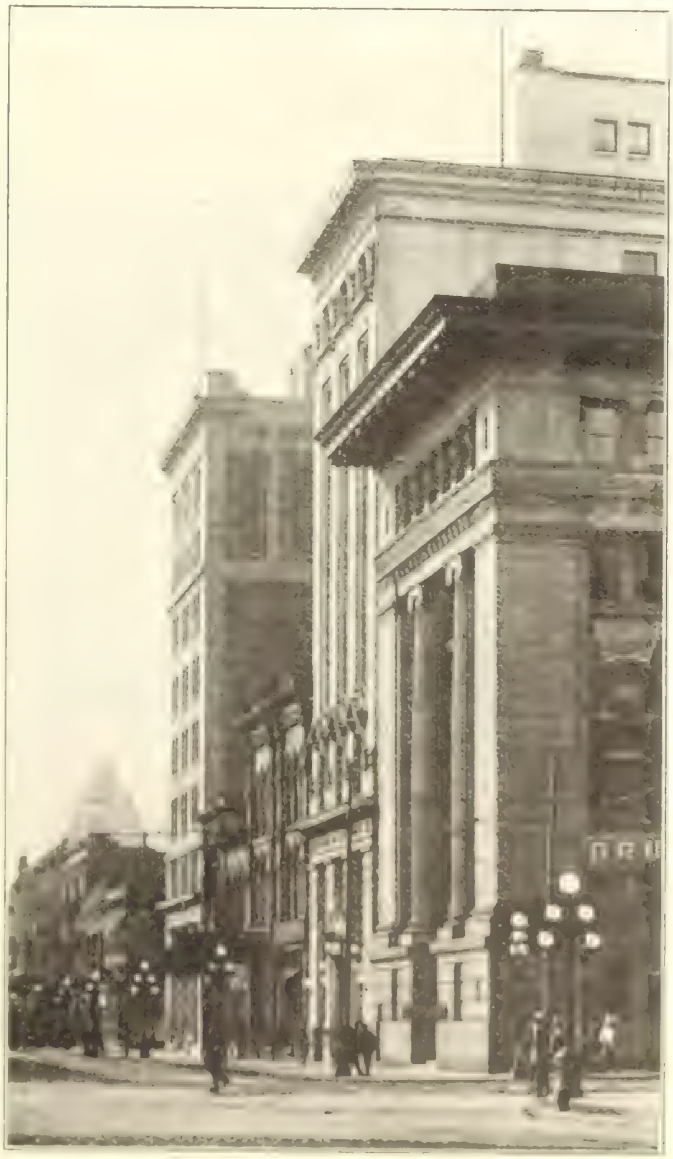
There was a period, not so long past, in the history of the city when architects got little encouragement. Residences were made to suit the stock in the mill yard; the mouldings, balusters, and other factory work were selected and put together without taste. The business blocks were no better than the residences. A number of the structures of this period are still standing—the Hotel Metropole on Abbott street is an example.

A very large number of buildings erected during this period were put up purporting to be brick and stone structures, which could boast of very little brick anywhere except in the side walls, the front and rear walls consisting of wood framing filled with glass, and covered with sheet metal. Of course, there were buildings of superior class. The Bank of Montreal has been standing for some twenty years, and there are other buildings of note including the Bank of British North America Building, Molsons Bank Building, and a number of others of substantial construction and good design. But the great change came with the introduction of steel and concrete frame structures, which formed a new departure—almost a new era in the architecture of Vancouver.

The Hutchinson Building and the Hotel Europe, erected in 1908, were the first examples of reinforced concrete construction in the city. The first building erected with an independent steel frame was the Dominion Building, completed in 1910. The Canadian Bank of Commerce and the new Post Office, although built about the same time, were not dependent for the support of their structure entirely upon the steel frame; they were what is termed "partially steel framed." With these buildings began the era of tall buildings in Vancouver which brings us to the present date.

The larger and more important buildings form groups along the main lines of traffic. Undoubtedly Hastings street and Granville streets are without exception the most important routes of commercial traffic in the city. Here there are several good types of Renaissance; the Canadian Bank of Commerce building, a handsome and massive stone structure; in which the Ionic order predominates in classical proportion. The new Post Office, another handsome building, but not so chaste in design, the Bank of Ottawa, a very correct design in lighter detail of Italian Renaissance, and the Canada Life Building, a handsome and origi-

Eight-storey apartment house to be erected on Gilford St.



Corner of Hastings and Granville Sreets, showing Bank of Commerce, Canada Life Building and the Bank of Ottawa

Constructional view new St. Paul's Hospital. Architect, R. F. Tegen.
Contractors, Norton Griffifths Company

Vancouver Block, Granville St., described on p. 52

Addition to B.C. Sugar Refinery

nal design in glazed terra cotta, in excellent taste. We mention these buildings as evidencing a great advance in correct architectural design, but they are only a few of the large buildings around this centre within a short distance. There are also the Rogers Building, the London Building, the North-West Canada Trust Building, the new Dominion Trust Building, the Winch Building, and the Metropolitan Building.

The next in importance of these groups occurs with the crossing of Robson and Granville streets as its centre, and consists of the new Vancouver Block, the new steel framed building of the Vancouver Hotel and the new Provincial Court House, to which is now being added a ten-storey building for Henry Birks & Sons, of Montreal, and there is also a very extensive building under construction for the Hudson's Bay Company to be erected on the corner of Georgia and Granville streets at a cost of approximately $2,000,000, as well as a new sixteen-storey extension of the Hotel Vancouver to cost $2,000,000.

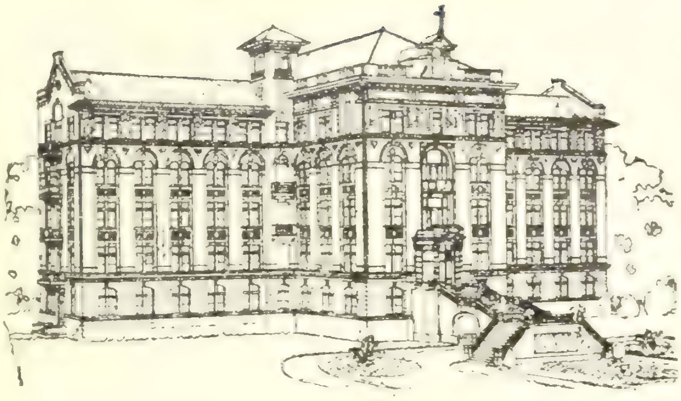
Steel and concrete framed buildings are scattered throughout all parts of the city, in single blocks as well. The number of new warehouse buildings is legion, and these are to be found in the wholesale districts extending from the C. P. R. depot to Hastings Sawmill, and from Hastings street to the waterfront, as well as in the new wholesale section extending southward from Pender street to False Creek, between Columbia avenue and the Granville street bridge. The progress in this class of building, has been as marvellous as in office blocks. Nor is it less remarkable in domestic architecture. Large apartment blocks from four to eight storeys in height are to be seen in all parts of the residential districts, especially in the West End.

St. Paul's Hospital

This handsome building is situated on Burrard street, and will shortly be completed. The design is in Italian Renaissance. Exclusive of power house and laundry the building covers an area of 15,000 square feet. Its length is 200 ft., and height five storeys, the construction being of reinforced concrete faced with pressed brick, with terra cotta and stone dressing. Metal and tile is used for the roof and in summer the patients will have the advantage of a fine roof garden. Besides the chapel, administration rooms, fever and operating rooms, there will be space accommodation for fully 150 patients. In designing the building, the architect, while forming a complete structure, has made provision for additional accommodation in such a manner that it can readily be given by making the hospital the centre of a still more costly building. The estimated cost of the structure is placed at approximately $150,000. The Norton Griffiths Steel Construction Company are the contractors. Mr. R. F. Tegen was the architect.

Sylvia Court Apartments

Construction work has just been completed on this eight-storey store and apartment building which is admirably situated on the corner of Gilford street and Beach avenue, facing English Bay. The site measures 66 x 132 feet, and faces on three streets. The structure is of reinforced concrete construction, fireproof throughout, and is faced on three elevations with mat glazed terra cotta and pressed brick. The building contains 77 apartments which are replete with the most up-to-date fixtures. The cost is estimated at $225,000. Messrs. Booker, Campbell & Whipple, Limited, were the contractors, and Mr. W. P. White was the architect.

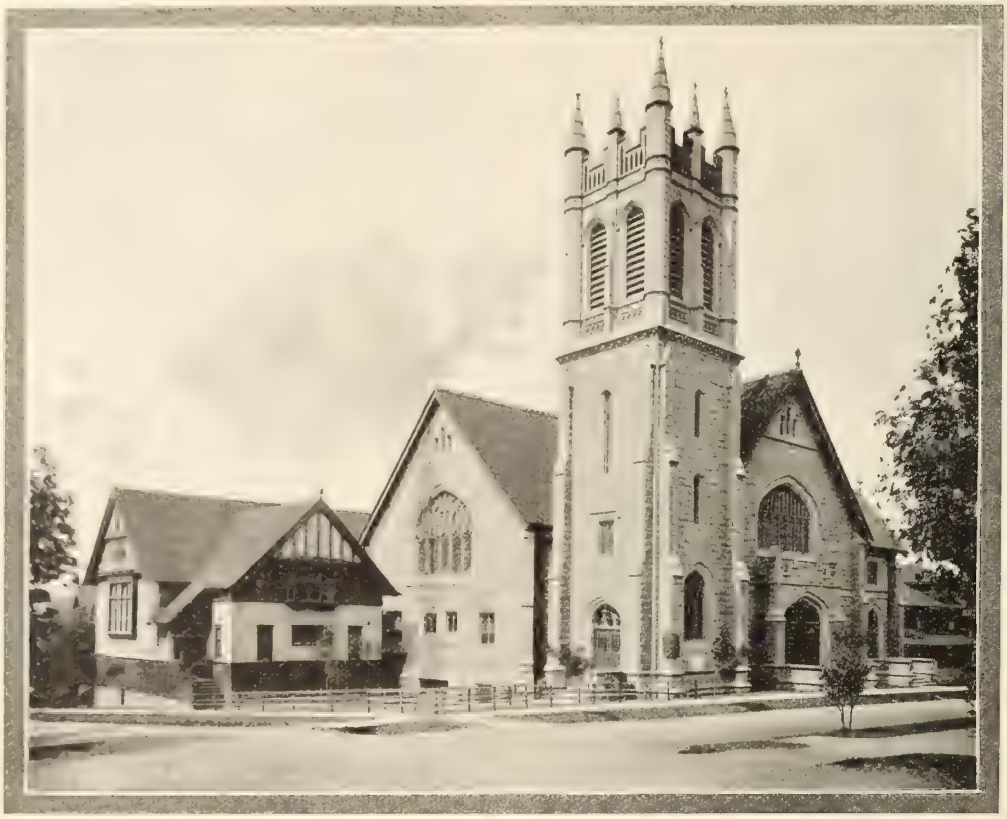


St. Paul's Hospital, as it will appear upon completion

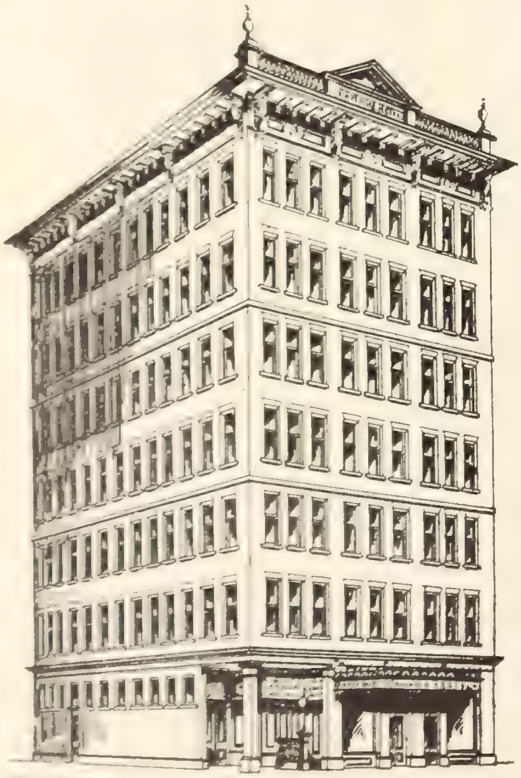
The Bank of Ottawa Building

This building is situated in the heart of the city at the corner of Seymour and Hastings streets, and was completed early in 1912 at a total cost of $250,000. The structure covers an area of 6,240 feet, is eight storeys in height, with full basement, and is of reinforced concrete construction throughout. The walls are of stone, brick and terra cotta, the first storey of selected sandstone, and above that to the roof pressed brick and terra cotta. The floors are of reinforced concrete and the entire building is fireproof. The main entrance is finished in marble and the corridors with a specially designed wainscotting, four feet high, with marble base. The floors were laid in ceramic mosaic

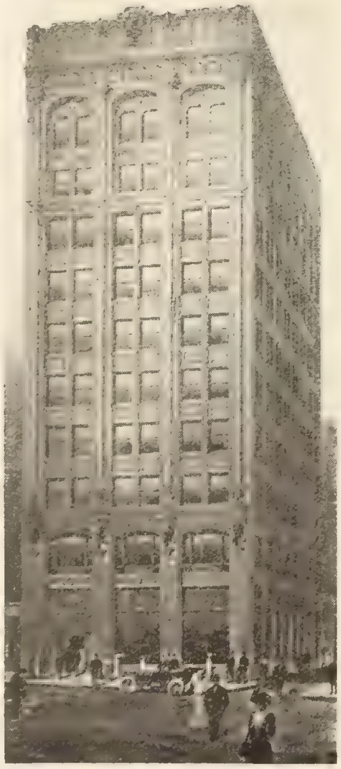
The Bank of Ottawa Building, Seymour and Hastings Streets, Vancouver



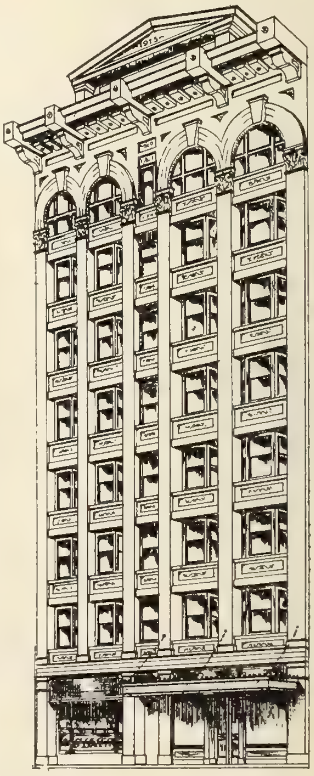
St. John's Presbyterian Church, Pendrell Street, Vancouver



Canada Hotel, upon which operations were commenced recently



Yorkshire Guarantee Corporation's projected building



Proposed Regent Hotel Hastings St. East

tile. The building contains 112 offices. Two electric elevators have been installed.

Messrs. Somervil & Putnam were the architects and Messrs. McDonald & Wilson the general contractors. The Canadian Ferro Concrete Construction Company completed the structural portion of the building.

The Rogers Building

This handsome building is most centrally located on the corner of Granville and Pender streets, Vancouver, and was completed at the latter part of 1912, at a cost of $600,000 The structure is ten storeys in height, of steel and reinforced concrete construction throughout, and contains 350 offices. The frontage on Granville street is 100 feet, and 122 feet on Pender street. The exterior is faced with cream colored terra cotta and polished Glasgow granite. The style is of the modern French Renaissance. Three of the handsomest stores in the city are situated on the ground floor. The interior finish of the building is hardwood, with white Italian marble in the corridors and stairs. There are four high speed passenger elevators of the worm-gear action type. The construction work was carried out by Messrs. Purdy & Henderson, and Messrs. Gould & Champney were the architects.

The London Building

This building is located on Pender street between Granville and Seymour streets, and was erected for the London and British North America Company, Limited. The main portion of the structure was completed at the end of 1912. The dimensions are 52 x 120 feet, and the building is ten storeys in height with full basement. The construction is reinforced concrete with front exterior facing of Haddington Island stone, carved and surmounted by a cornice of the same material. The remaining walls are hollow brick. All partitions are hollow clay tile to guard against fire. The flooring of the corridors is Terrazzo tile with marble borders. The entrance hall is decorated in marble. Maple is used as inside finish throughout. The cost of

Bank of Commerce, corner of Hastings and Granville Streets, Vancouver

The Rogers Building, Vancouver, completed recently

Weart Building, now under construction

the building is approximately $275,000. The Canadian Ferro-Concrete Construction Company erected this structure and Messrs. Somervell & Putman were the architects.

The North-West Canada Trust Building

A record for fast construction work in Vancouver was established on this building, the construction of which was completed last September. The building is situated on Richards street, near Pender street, the actual working time taken for the erection of the reinforced concrete frame, being 55 days. The entire building was completed in 5 1-3 months. The dimensions are 50 x 78 feet. The front elevation is faced with buff brick; terra cotta and stone, with granite base and concrete coping. The building is heated by a low pressure deloil and steam system. Quarter sawed oak trimmings are used as finish on the ground floor, and birch on the upper floors. The ground floor is occupied by the offices of the Trust Company, and the upper seven floors are divided into large offices. This building represents an expenditure of $120,000. The Dominion Construction & Supply Company, Limited, were the contractors, and J. P. Matheson & Sons prepared the plans.

The World Building

This structure has a frontage of 70 feet on Pender street and 126 feet on Beatty street, and was completed at the latter end of 1912 at a total outlay of $560,000. The height above the pavement is 269 feet, which makes this building the tallest in Vancouver. The construction is steel frame with outer walls of Clayburn pressed brick, trimmed with terra cotta. Haddington Island stone is used up to the second storey. The Clinton fireproof fabric is employed. The steel frame contract was the largest single contract ever awarded in the city. All floors are maple, and the inside finish throughout is mahogany. Mr. W. T. Whiteway was the architect, and Messrs. Smith & Sherborne were the contractors.

Molsons Bank Building

This six-storey office building was erected last year at the corner of Hastings street and Market Lane, and is of reinforced concrete construction, faced with pressed brick and architectural terra cotta. The banking quarters occupy the entire ground floor space. The main entrance vestibule is decorated in Italian marble. All staircases are marble and the corridors have tile floors. The upper floors are occupied by fully equipped offices. The cost was approximately $100,000. Messrs. H. L. Stevens & Company prepared the plans, and also took charge of the construction.

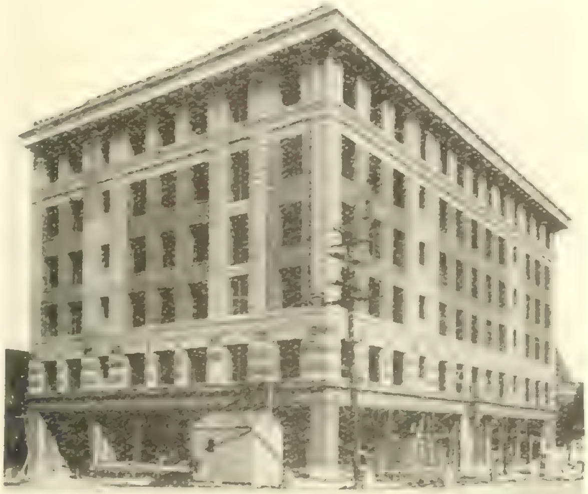
The Vancouver Block

Situated on the highest point of the city's business centre, where it can be viewed for miles in every direction, this is the most spectacular office building in Vancouver. The frontage on Granville street is 75 feet, extending back to a depth of 120 feet, and the height of the building above the pavement, is 250 feet. The foundation is of concrete and the superstructure of concrete, with white terra cotta and pressed brick on heavy steel frame. The side walls are enamelled white to match the terra cotta finish on the front and rear elevations. A wrought iron marquise extends along the entire frontage. The entrance is treated in white Italian marble, with floors of grey Tennessee marble, laid basket weave style. The staircase is white Italian marble, and the same material is used for the wainscotting in the corridors to a height of 4 feet. The flooring in all corridors is Terrazzo tile. The interior finish throughout is selected eastern white oak. Three gearless traction, high-speed elevators have been installed. The Webster Modulating system of steam heating is employed. The vacuum cleaning plant is on the Palm system. There are fifteen storeys in the building. The immense clock which has been installed in the clock tower at the top of the structure is a striking feature. This clock has four dials and measures 22 feet in diameter. There are 360

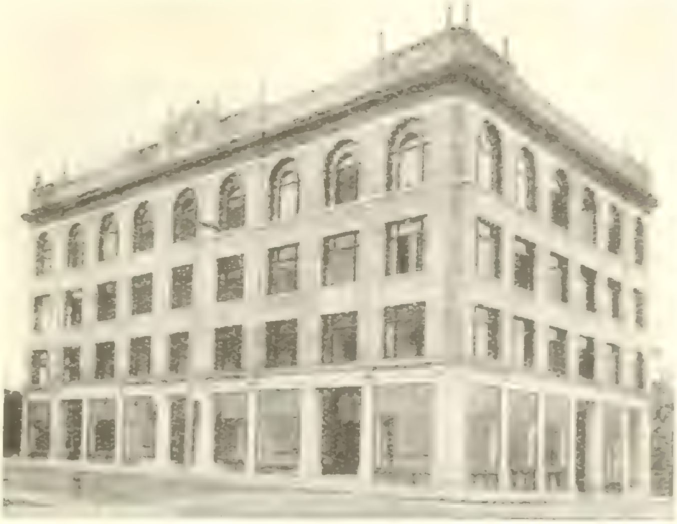
North West Canada Trust Building

World Building nearing completion

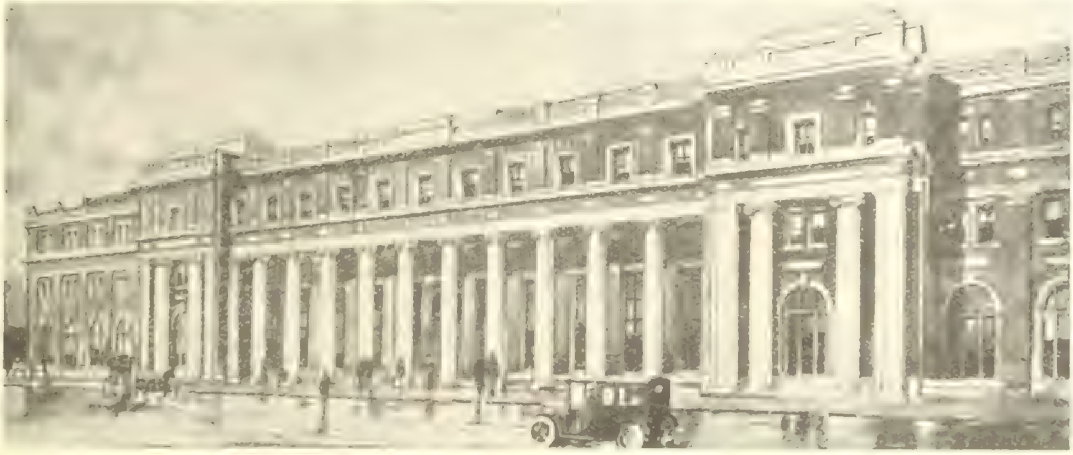
The new Burns Block, Granville Street



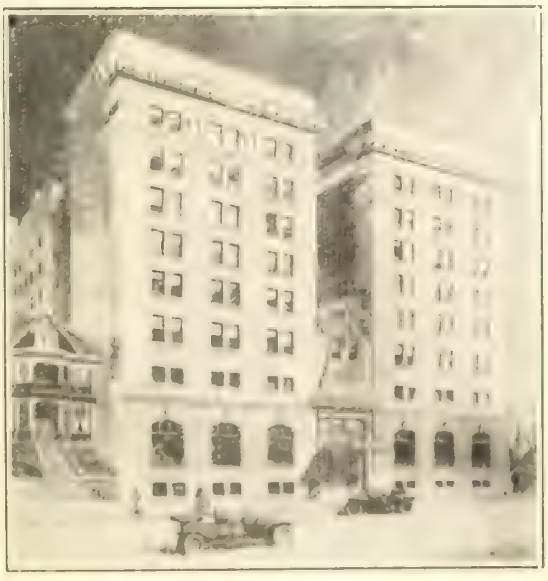
Building corner of Homer and Dunsmuir Sts.
Baines & Horie, architects and contractors



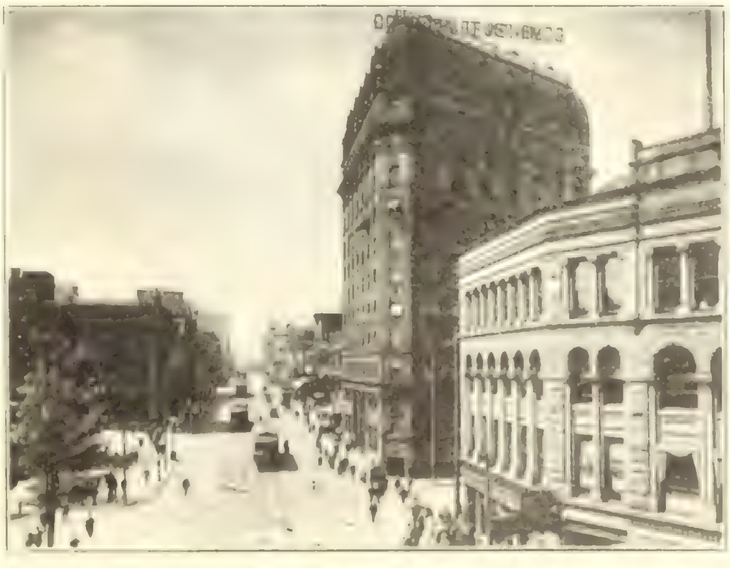
Vancouver Labor Temple



C.P.R. Terminal Station. Architects' perspective



Y.M.C.A. Building, as it will appear upon completion



Hastings Street, Vancouver, looking west offices in the building. The ground floor is occupied by four handsomely finished stores. The cost of the entire structure complete was approximately $700,000. The Norton Griffiths Steel Construction Company were the contractors. Messrs. Parr & Fee prepared the plans.

Englesea Lodge Apartment Building, completed recently

Birks Building

Construction on this important building project was commenced last summer. The structure occupies a site on the corner of Georgia and Granville streets facing the new C. P. R. Hotel. It has a frontage of 100 feet and a depth of 120 feet, and is 10 storeys in height. The foundation is of concrete and the superstructure of concrete and terra cotta on steel frame. The building will be fireproof. The proprietors are Henry Birks & Sons, Limited, jewellers, of Montreal, Winnipeg and Vancouver. The firm's store and show rooms will occupy the ground floor space, and will be fitted up in magnificent style with marble from the Missisquoi Company's quarries. This will be the third largest jewelry store in the world when completed. The first floor will contain the mail order department and will also provide space for factory purposes. The rest of the building will be devoted to office suites which are to be fitted up in the most expensive style. The cost of erecting this structure will be approximately $500,000. The terra cotta work has now been completed to a height of two storeys, and work is proceeding rapidly on the remainder. The Norton Griffiths Steel Construction Company is carrying on the contract. Messrs. Somervel & Putnam were the architects.

Post Office Vancouver, corner of Granville and Hastings Sts.

The New Dominion Trust Building

Situated at the corner of Pender and Homer streets, this building measures 50 x 120 feet, contains eight storeys, and is of steel frame and concrete construction. Up to the first storey, the exterior is composed of blue Bedford, Indiana, stone, and above that, pressed brick, with terra cotta window sills, cornice, etc., the ornamental terra cotta work matching with Bedford stone. The banking room on the first floor is finished in mahogany wood and Italian marble. All floors in the building are of Terrazzo marble, and the corridors are lined with marble and quartered oak. There are safety deposit banks in the basement. The Norton Griffiths Steel Construction Company were the contractors, and Mr. H. S. Griffiths was the architect.

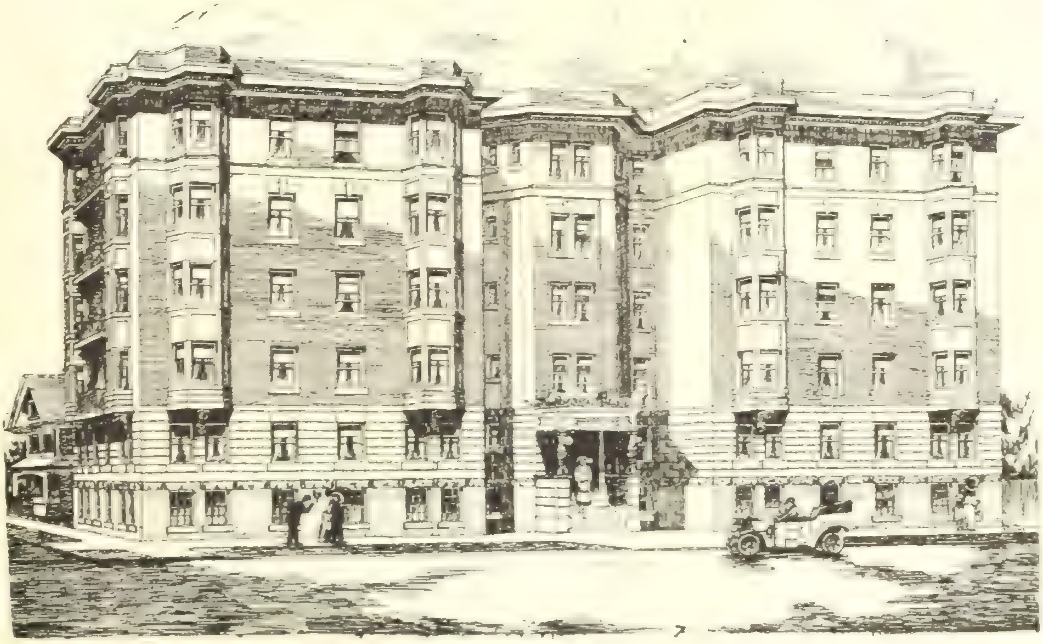
Vancouver Industries

THE list of Vancouver industries and products includes all the manufactured articles usually produced in a progressive industrial centre. Among the features of Vancouver manufactures are the extensive timber products, wooden water pipe, sectional dwellings and business buildings, sugar, cut glass, coal-tar by-products, flour, ships, structural steel, disappearing beds, tents, sails and flags, cured and salted fish.

Manufacturing plants, inside city limits...	130
Value of annual output	$15,668,483
Capital invested	22,815,375
Number of employees	8,966

The lumbering industry gives employment to 3,854 men within the limits of Vancouver alone, and the annual payroll for 1911 was $2,091,729.93, and the gross output was valued at $6,017,043.87. The capital invested at the beginning of the present year was $8,439,092.17. During 1911 in the Coast District, 739,000,000 feet of lumber were prepared for market, and of this amount 326 000.000 feet were used in Vancouver and the immediate vicinity; 340.000.000 feet were sent to the prairie provinces, and 47,000,000 feet found a market in foreign countries.

The city of Vancouver has successfully met the demands of its citizens for parks and recreation grounds, as the following figures will demonstrate. In 1890, $5,000 was expended for parks; in 1895, $4,254; in 1900, $7,100; in 1908, $20,500. In 1912 over $420,000 was expended. This is in the upkeep of parks already owned by the city, also for the purchase of new park sites.

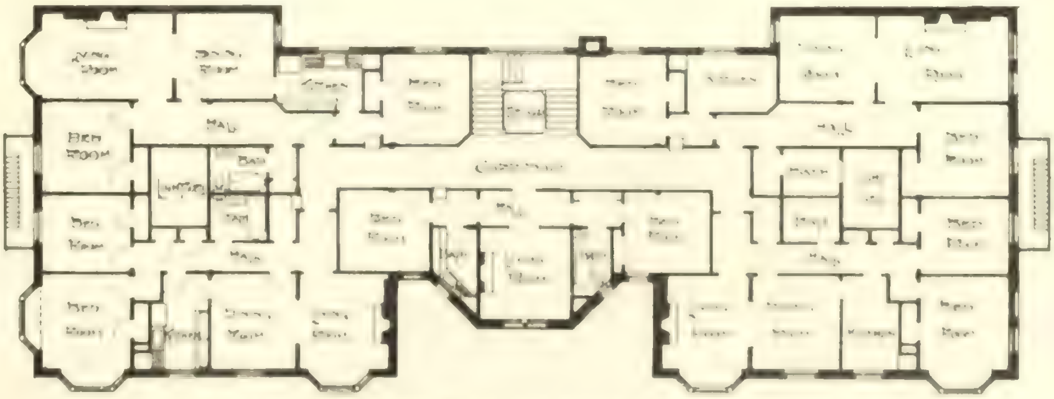


Hampton Court Apartment House. Architects, Messrs. Grant, Henderson & Cook

Hampton Court Apartment House

THE accompanying plans illustrate a type of apartment house of which there were numbers erected in the residential sections of Vancouver, during the year 1912. This building was recently erected on Thurlow street, in the West End, by Messrs. Grant, Henderson & Cook, architects. It measures 50 x 131 feet, open on three sides. The structure is of brick and concrete, faced with buff colored pressed brick and dressed sandstone trim. The interior is solid mill construction. Each floor has five complete suits providing a living room and dining room, two bedrooms, bathroom and kitchen. Each suite is equipped in a very complete manner, having telephone, house phone, fire alarm, open fireplace with ash chute to basement, delivery locker, etc. The basement contains servants quarters, the hot water heating plant, laundry and drying rooms, service and delivery lockers, etc. The cost of this building was $100,000.

Other important projects upon which construction has recently been commenced or is already well advanced, include the following: A two-million dollar hotel for the Canadian Pacific Railway Company, a million dollar passenger and freight depot also for the C.P.R., a huge store building for the Hudson's Bay Company, two new theatres, the Orpheum, on Granville street, and E. R. Ricketts Theatre and office building, on Pender street, the new Y. M. C. A. building, Yorkshire Guarantee & Securities building, and the New Vancouver Club building. The list of buildings upon which construction is expected to commence shortly includes the Weart Building to cost $700,000,



Typical floor plan, Hampton Court Apartment House the [illegible] Building costing $500,000, the new addition to Woodwards department store, a new police station, new city hall and numerous other extensive projects in the central business sections and residential districts.

The Provincial Court House

This building occupies an entire city block, with frontage on four streets—Georgia, Hornby, Robson and Howe. A short time before construction of the main portion was completed in 1912, it was realized that the building as originally designed, would prove inadequate for the rapidly growing business of the provincial authorities, and Mr. Thos. Hooper, architect, was instructed to prepare plans for an extensive addition. Work on the new addition was started in May, 1912, and, it is expected will be finished next August. Plans are now being prepared for a second addition of similar design, and construction will be commenced at an early date. The architectural features of the main building and the present addition are practically in agreement. Granite is used up to the first storey and above that, the exterior is of Haddington Island stone. The main entrances of both buildings are approached by a broad flight of granite steps. Two columns of Haddington Island stone are situated at each side of the entrance, and in the main building the flight of steps is bounded on each side by the crouching figures of lions sculptered in granite, resting on a granite pedestal. Two bronze electroliers will be placed on either side of the entrance steps in the addition. All floors are constructed of concrete, reinforced with Clinton fireproof fabric. The main entrance hall is panelled in marble to a height of 9 feet, and the floors throughout the building are covered with rubber tile. The staircases are marble with wrought iron balustrades, and marble wainscotting is used in all corridors. The dome in the centre of the main building extends upwards from the first floor and is covered with wire glass. The ground floor of the main building is occupied by the Land Registry offices, the offices of the assessor, timber inspector, police department, boiler inspector, fruit inspector and others. The first floor contains the county Criminal Court, Supreme Court, Junior Criminal Court, Examination rooms and many offices and apartments in connection therewith. Situated on the second floor are the Criminal Assize

New Provincial Court House, Vancouver

B. C. Provincial Court House under construction

Court, Appeal Court, Jury Chambers, Barristers' Rooms, Library, office of Attorney-General, etc.

Quarter sawed oak is used as inside finish throughout. The interior decoration of the addition exactly resembles that of the main building, and the arrangement of court rooms and offices in both buildings is similar. The two buildings are connected by a corridor, built of Haddington Island stone.

Mr. F. M. Rattenbury, Victoria, was the architect for the main structure; Messrs. McDonald & Wilson were the contractors, and are also erecting the addition.

Vancouver school expenditures in 1912 were heavy, being in the neighborhood of $1,750,000. This sum includes an appropriation of half a million dollars for the proposed British Columbia University Buildings, upon which construction has not yet been commenced. About half a million dollars represented the appropriations for the construction of hospitals during the year.

At the beginning of 1913 there were 61 buildings under construction or for which contracts had been let, costing $15,000 or more. In addition to this, the number of proposed buildings costing over $20,000 were fifty, with a total valuation of over $12,000,000. At present, there is every indication of renewed activity in building construction following, the late suspension of work on account of the unfavorable weather. The splendid outlook justifies the belief that the wonderful record of 1912 will easily be surpassed during the present year.

Municipal Engineering Work at Vancouver

LAST year's total of 30.79 miles brings the total amount of sewers laid in the city of Vancouver to 153.55 miles. A good start has been made on the Greater Vancouver Sewerage Scheme. Towards the end of 1911 a committee composed of representatives of the city council and the municipal councils of Point Grey, Burnaby, and South Vancouver, approved of the recommendation of the City Engineer, and appointed Mr. R. S. Lea, of Montreal as Consulting Engineer for the joint body. Mr. Lea has been responsible for the location and sizes of all trunk sewers, while the design and construction have come under the supervision of this department. The trunk sewers, constructed during 1912, go much beyond all previous work in respect to size, while the use of reinforced concrete is an entirely new departure.

Balaclava Trunk Sewer

The Balaclava sewer runs in a straight line from near Broadway along Balaclava street to the Point Grey road, with a temporary outfall to English Bay. It is constructed of reinforced concrete of the horseshoe form, the Harlem proportions being adopted, in which the height of the wall is one-third of the intrados radius, and the invert radius is equal to the horizontal diameter of the sewer. The inside width of the Balaclava sewer is 10 feet 4 inches, and its height in the centre 8 feet 3 inches. The cross section of the concrete and the steel reinforcement is shown in accompanying drawing. Three types of cross section were designed, type "A" for use where the ground is reliable up to the springing line, type "B" for the case in which the sound material rises only to the haunch or a little above it, and type "C" with invert reinforcement for soft ground. It has only been necessary to depart from type "A" for a very short space on this contract. Three different qualities of concrete are used in the cross section, the strongest being put in the arch. The invert is lined with vitrified brick.

The grade of the sewer is 0.72 per cent. throughout. Junctions have been provided for laterals where the various avenues cross it, some of these laterals being 30 in. in diameter. The laterals, when finished, will provide a complete system of sewerage for the wide valley which lies roughly between Balsam street and Collingwood street. The laterals on Third and Fourth avenues are being constructed with despatch by the city workmen, who have already completed those on Point Grey road and First and Second avenue.

The contractors for the Balaclava Trunk Sewer are Palmer Bros. & Henning. The sewer is completed up to the end of the contract at time of writing. The length of the sewer embraced in the contract is 2,350 feet.

China Creek Trunk Sewer

The China Creek Sewer and its Canoe Creek branch are intended to provide an outlet for the sewerage and storm water from the greater part of Ward Eight. It will also have to convey a large amount of water which comes in from South Vancouver by way of China Creek.

The main trunk sewer is at present the largest one in the city. It runs from Eleventh avenue to Seventh avenue, following the general course of China Creek. A large wooden flume has been put in at the lower end to convey the discharge along Seventh avenue into False Creek, pending the extension of the sewer northwards in the near future. There are two curves of about 45 degrees each, the radius being 200 feet. The contractor resorted to tunnelling along the lower curve for a portion of the way. The sewer is of reinforced concrete, the outline being the Harlem form of horseshoe. Its width is 11 feet 4 inches, and it height 9 feet 1 inch. The cross section is increased on the curves to compensate for the loss of head through friction against the concave side wall. The longitudinal reinforcement is also strengthened on the outside of the curves to resist the centrifugal action of the water, the velocity of which will be over 25 feet per second when the sewer is running full. The grade is 1 per cent. throughout.

China Creek Sewer before paving

All three types of construction have been used. The nature of the ground limited the employment of type "A" to 450 feet. Type "B" was used for 560 feet, but it was necessary to resort to the stronger type "C" more or less modified, in the less difficult places, for a length of 635 feet.

The reinforcing steel is the same size as that used in the Balaclava sewer; but the spacing of the bars and the thickness of the concrete are modified to suit the larger section and shallower fill.

At the end of 112, a little more than 150 feet of sewer remained to be constructed out of a total length of 1,800 feet. The paving was held over by the contractors, but is now proceeding.

Sand trap in sewer at Twelfth Avenue and Bridge Street, Vancouver

The Canoe Creek branch follows a north-easterly course from the inlet on the south side of Fifteenth avenue near Glen Drive to its junction with the main China Creek trunk sewer on Clark drive and Eleventh avenue. It crosses four blocks in a slanting direction. The owners of the properties which were affected granted an easement for the purpose of construction. The portion of the sewer between the intake at Fifteenth avenue and the south side of Twelfth avenue, amounting to 1,460 feet, is of concrete, and was constructed by the city workmen. Its width is 6 feet, and its height in the centre 6 feet 6 inches, the top being semi-circular, and the invert a shallow circular curve, with a central depth of 10 inches. The grade is moderate, but not uniform, as the branch sewer had to be constructed to suit existing concrete culverts under the roadways.

The remaining length of 445 feet is of reinforced concrete, and was constructed by the contractors for the China Creek sewer, the Graff Construction Company. It has the Harlem horseshoe form, its width being 5 feet 6 inches, and its height 4 feet 5 inches. The grade is steep, being almost exactly 5 per cent. Its construction is practically completed with the exception of the brick invert lining.

Bridge Street Trunk Sewers

The Bridge street sewer extends from the South Vancouver boundary on Sixteenth avenue to the beginning of the storm outfall sewers on Sixth avenue. Its form and that of its branches is circular, the lower half being lined in all cases with vitrified brick. It has a diameter of 5 feet 6 inches for the first 2,000 feet, increased to 6 feet for the next 900 feet, and to 6 feet 6 inches for the lower 400 feet. The uppermost 1,850 feet, reaching nearly to Tenth avenue, were contracted for by Mr. John Shunn. The remainder was constructed by the city workmen, also the large quadrantal junctions to branch sewers at Twelfth, Tenth, Broadway, Seventh and Sixth avenues, and the sand-traps at Twelfth, Tenth and Seventh avenues.

Two short curves in the ravine east of the Normal School called for special reinforcement, especially the lower one, which was at the foot of a 10 per cent. grade, and was surrounded by a mere earth fill. Longitudinal reinforcing bars crossed at intervals by hoops which were used in the arch on the outside; while a triangular pier with its lower end radial to the curve was formed of rubble concrete to take the thrust.

One of the branch sewers, leading from the intersection of Willow street and Sixteenth avenue to the Bridge street sewer at Twelfth avenue, and conveying a large amount of storm water and sewage from Point Grey municipality, was contracted for by D. McGarry & Company. The upper portion of 1,700 feet has a diameter of 5 feet, the lower 1,100 feet being 6 inches larger. The branch on Broadway extends to Ash street, and was built by the city. Its length is 590 feet, and diameter 3 feet 6 inches.

The city workmen also completed the construction of a bye-pass leading from the lower end of the Bridge street sewer to an outfall in the city yard. The first portion which was carried out by the city is 1,420 feet in length, circular in form, 4 feet in diameter, and constructed of concrete, brick-lined in the lower half. The end of the 4-foot sewer was connected into an existing 5-foot sewer, the lower end of which was then continued to the outfall. This portion is of reinforced concrete, the section adopted being of the Harlem horseshoe type, with a width of 5 feet 6 inches, and a height of 4 feet 4 inches, 730 feet long. It is reinforced with Clinton fabric in the arch, and with longitudinal rods below, crossed with half-inch invert bars. This was necessary owing to the unreliable nature of the fill in the city yard. It was also necessary to support the sewer in this place on concrete-capped piles driven at 9-foot intervals. A connection between the Bridge street sewer and the bye-pass is provided, so that the dry-weather flow and ordinary sewage may be diverted from the storm outlet sewer until an intercepting sewer has been built. Provision has been made for intercepting sewers both at Sixth avenue and Seventh

Storm outfall sewer, Heather Street, Vancouver avenue. The byepass will then serve a further and necessary purpose in affording a means of draining the intercepting sewer when repairs have to be made in it.

The whole of the work in this section is completed.

Sixth Avenue Storm Outfall Sewer

This sewer is intended to take the storm water from the Bridge street sewer, and conduct it along Sixth avenue to an outfall at the foot of Heather street, immediately to the east of the Vancouver Engineering Works wharf. It is of reinforced concrete of the Harlem horseshoe form, its width being 9 feet, and its height 7 feet 3 inches, the invert being brick-lined. The grade is approximately 1 per cent., but is increased on two curves to compensate for the loss of head through friction. The total length from the junction with the Bridge street sewer to the outfall is 1,250 feet. The upper 960 feet is of lighter construction than the remaining 290 feet. The latter is crossed by the C.P.R. tracks at one place; and its lower end will be subjected to heavy loads in the future when the wharf is extended over it. The size of the hoops is ½ inch square; but their spacing is varied as the circumstances require.

Curve on Sixth Avenue storm sewer

The lower portion of the sewer is carried on piers where it crosses the tidal flat. The piers are carried down to the rock, and the interspaces packed with riprap and grouted. The lower longitudinal bars are also strengthened to add to the security of the invert here.

A length of 630 feet of the sewer has been constructed, from the outfall end across the tidal flat and for some way up Sixth avenue.

Keefer, Templeton and Union Streets Sewer

This sewer is an extension southward of the Victoria Drive outfall, and was constructed under contract by Messrs. Bruce & Lord. The sewer is 3 feet 6 inches in diameter, built of concrete with 9 courses of paving bricks in the invert. It is approximately 1,550 feet long, and has an average grade of [illegible] per cent.

Sixth Avenue and Victoria Drive Sewer

The continuation of Sixth avenue trunk sewer to Victoria Drive, thence north to Third avenue and south to Broadway was constructed by city workmen. The sewer throughout is of circular section with brick invert, and is 4 feet in diameter on Sixth avenue between Commercial and Victoria Drives; 3 feet on Victoria Drive south of Sixth avenue, and 2 feet 6 inches north. The total length is about 2,800 feet, and the average grade is .50 per cent. A cut of about 35 feet had to be made on Victoria drive at Seventh avenue, while a special bell-mouth was constructed at the intersection of the north and south branches with the main sewer on Sixth avenue.

Alexander and Water Street Sewer

As the Canadian Pacific Railway Company would not agree to share the cost of a new sewer to replace the box-drains at Cambie street, it was found advisable to take this drainage to Columbia avenue, via Alexander and Water streets. The sewer was designed large enough to carry sewage from Abbott street outfall, thus abandoning this outlet except for storm overflow purposes. The three outfalls have thus been taken to Columbia avenue, and extended to deep water. The sewer is of circular section, 4 feet in diameter between Columbia and Abbott streets, and 3 feet 6 inches between Abbott and Cambie streets. The total length is about 1,570 feet and the average grade .25 per cent. It was built by city workmen.

A minor contract amounting to 500 feet of circular sewer 3 feet 6 inches in diameter on Sixteenth avenue, was an upward extension of the Manitoba street sewer, and was built under contract by Mr. John Shunn.

PAVING CONSTRUCTION

The total number of works carried out under the Local Improvement Act in 1912 was 306, as compared with 230 in 1911—being made up as follows:—

	1911	1912
Pavements	45	67
Macadam roadways	8	0
Sidewalks, concrete	157	155
Curbs, concrete	14	65
Street and lane widenings	1	5
Lane openings	5	14
	230	306

Pavements

Permanent pavements again proved to be one of the main features of the season's work in 1912, being far in excess of any previous year's record—in fact, exclusive of 1911's work the total mileage laid in 1912 is greater than the combined total of all the other years put together. A well defined policy of paving main arteries has been adhered to as closely as possible, most of the work having been done on the initiative

Laying wood block on Seymour Street Vancouver [illegible] and it is hoped to link up and further extend this system during the present year.

The total amount of permanent pavement constructed in 1912 was 485,391 sq. yards, representing a length of 20.81 miles, as compared with 305,062 sq. yards, or 13.017 miles in 1911.

Asphaltic Concrete

This class of pavement was laid in the city for the first time in 1912. The total amount of asphatic pavement constructed was 150,272 yards, representing a mileage of 7.757 miles.

Street Asphalt

Owing to the popularity of asphaltic concrete, the amount of street asphalt pavement constructed during 1912 shows practically no increase, work done in 1911 being 17,807 sq. yds., representing 1.119 miles, as compared with 17,612 sq. yds., representing 1.20 miles in 1911.

Bithulithic

The large yardage of asphaltic concrete was responsible for the decline of bithulithic pavement in last year's work, the total results being 22,682 sq. yds., representing a mileage of 1,183 miles, as compared with 56,646 sq. yds., or 3.48 miles in 1911.

Creosoted Wood Blocks

The amount of treated wood block pavement laid during 1912 was somewhat in excess of that laid in 1911, the total yardage being 189,875 sq. yds., representing 7.346 miles, as compared with 150,971 sq. yds., covering a mileage of 5.42 miles in 1911. There was also laid in 1911 30,317 sq. yds. or 1.19 miles of untreated cedar blocks. This class of pavement was entirely abandoned in 1912, past results having proved unsatisfactory where subjected to heavy traffic.

Brick Block

The introduction of this class of paving proved to be another desirable feature of the 1912 work. Vitrified brick blocks have been used in conjunction with asphaltic concrete and wood blocks on all steep grades. In all, 22,692 sq. yds., were constructed, representing a mileage of .970 miles.

Concrete

This class of pavement was introduced for the first time during 1912 in the paving of lanes. The total yardage laid was 2,870 sq. yds., representing .245 miles.

Granitoid

The total yardage of granitoid pavement laid last year was 17,834 sq. yds., representing .605 miles, as compared with 25,146 sq. yds., laid in 1911, covering .98 miles.

Stone Blocks

A considerable amount of this class of paving was carried out last year, several lanes adjoining main thoroughfares being paved. Last year's work resulted in 14,678 sq. yds., representing a mileage of 1.285 miles. This is exclusive of 40,681 sq. yds. used to pave the track allowance on streets over which the British Columbia Electric Railway Company operate street cars.

Cement Concrete Sidewalks

The number of sidewalk works carried out by Local Improvement was 155 in 1912, as against 157 in 1911. The total mileage, however, shows that 47.96 miles have been constructed last year, as compared with 41.30 miles in 1911, or an increase over 1911 of 6.66 miles.

Cement Concrete Curbs

The results of work done in 1912 show a large increase in cement concrete curbs, the total number of works undertaken being 65, as against 14 in 1911, representing a mileage of 16.149 miles, as compared with 1.12 miles in 1911

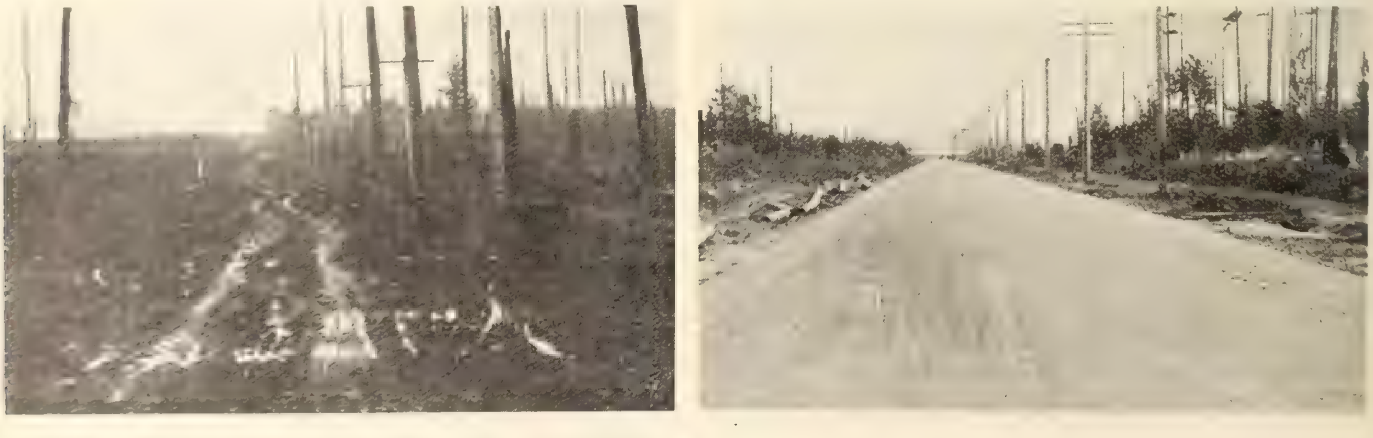
Street Improvements

	1911 Miles	1912 Miles
Clearing and rough grading streets	42.34	9.59
Clearing and rough grading boulevards	......	15.288
Clearing and rough grading lanes	20,53	16.564
Grading streets	24.28	19.422
Grading boulevards	......	12.764
Grading lanes	......	3.819
Rocking streets	19.18	13.141
Rocking lanes	......	4.279
Extending rocking to curbs	......	7.721
Resurfacing streets	......	5.031
Plank roadways, streets	7.23	24.285
Plank roadways, lanes	......	3.699
Three-plank walks	47.23	49.732

Transportation Facilities

Steam railway construction is developing rapidly, and at present three companies have entered the city: The Canadian Pacific Railway, the Northern Pacific over the C.P.R. lines, the Great Northern Railway. In the near future it is expected that five other companies will have located here.

A great portion of the water front of Burrard Inlet was handed over in early days to the Canadian



Granville Street South, Point Grey—Before and after bitulithic paving

Pacific Railway, and the city has been forced to provide terminal facilities on False Creek for other railroads coming in.

One hundred and forty acres of tide lands lying at the eastern end of False Creek in the heart of the city, were deeded to the Great Northern Railway in 1911 by the city, the railroad company agreeing to drain and fill in the land, erect a million dollar depot and install yards on this site. No time was lost in commencing the work of development and good progress has been made since starting operations. With the Great Northern in this project, is the Northern Pacific Railway which will also use the terminals, but the name of the depot and the management of the yards will rest in the Great Northern. Measuring from Main street to the extreme east end of the area embraced in the scheme, the distance is about one mile. In breadth, from Prior street to Seventh avenue, the distance is about 3,500 feet. In the centre of this there is a basin 4,300 feet long and 1,600 feet wide reserved by the city. This is to be bulkheaded with concrete and dredged, so that it will be navigable at all times of day and at all seasons of the year.

About this basin the yards, shops, freight sheds, repair tracks, store houses, passenger tracks and station are to be located. There is ample room for all of this equipment which will be sufficient for transacting an enormous business.

The passenger station is 250 feet long and 160 feet wide, and is to be built along the most modern lines. It will house all of the offices of the company. The scheme provides for the construction of an express house 600 feet long, one freight house 2,000 feet long, another 1,950 feet long, ten tracks for the receiving of trains and the distribution of cars, team tracks, freight house tracks, repair tracks, a roundhouse and turntable, passenger tracks, coal supply, water tanks, oil tanks, industrial tracks, coach tracks, and three overhead crossings.

An arrangement was recently made between the Canadian Northern Railway and the city of Vancouver for governing the railway free terminals alongisde the Great Northern at False Creek. The Canadian Northern agreement provides that four million dollars are to be spent in entering and improving the section remaining, which covers about 160 acres.

Projected Railroad Development

In addition to the False Creek scheme by the Canadian Northern Railway, another project—this one to utilize the north shore of the inlet—is under way. This is a plan to construct a steel bridge having a central swing span of 225 feet clear across the Second Narrows and give railroads access to North Vancouver. The bridge has been designed by Sir John Wolfe Barry, Lyster and Partners, of London, Eng. It is fathered by the Burrard Inlet Tunnel & Bridge Company. In connection with the bridge project, the company also has a charter to build a line from Eburne via the Second Narrows Bridge to Deep Cove, and also to Horseshoe Bay, Point Atkinson. This company is subsidized by the Dominion and Provincial governments, the city of Vancouver, the city and district of North Vancouver, and the municipalities of Point Grey and Burnaby.

At Vancouver, B.C., building permits for the month of February amounted to $1,045,204.

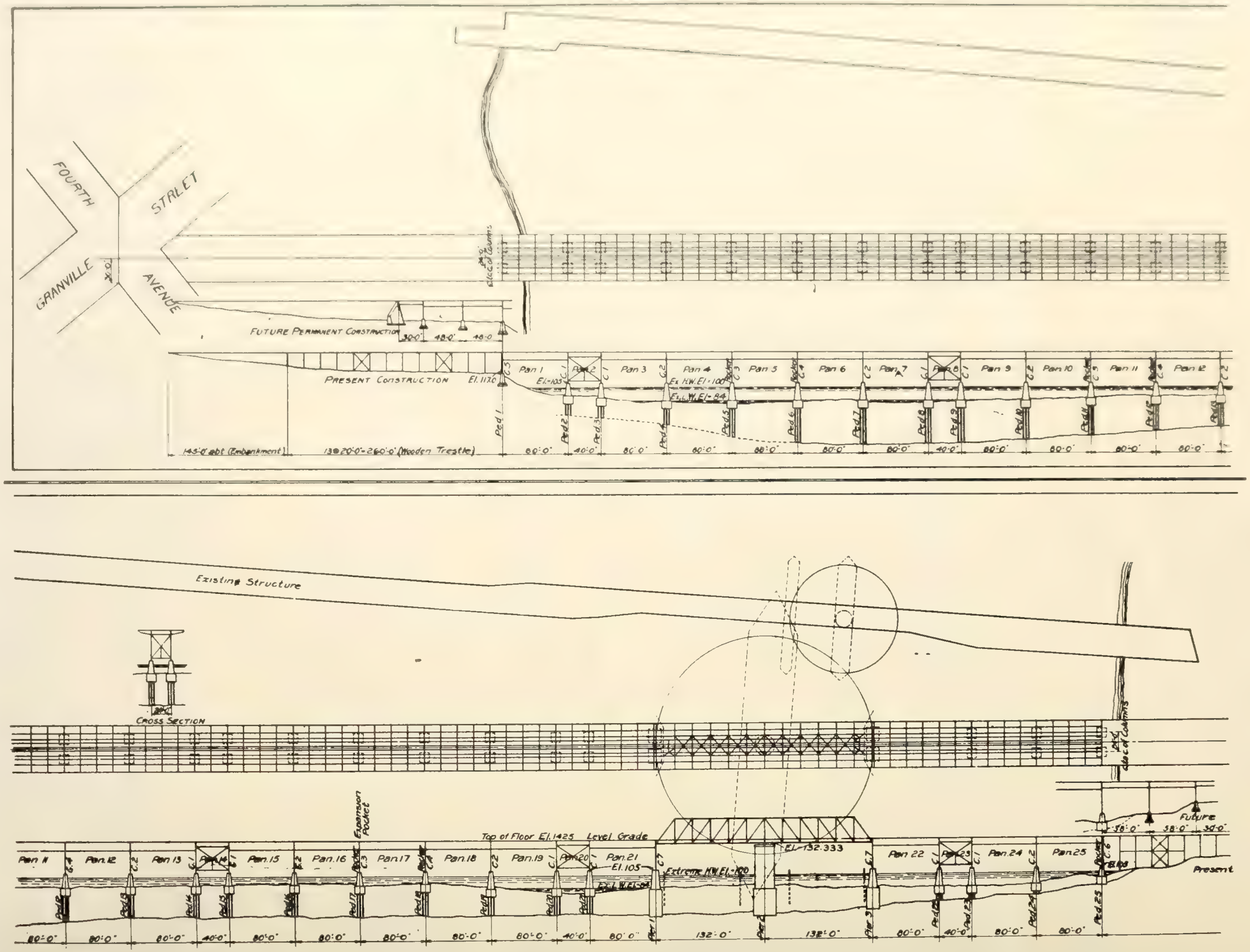
Bridge and Viaduct Construction

THE grade crossings of the Great Northern Railway at present existing in the East End of the City, have always been a decided drawback to the development of that district. About two years ago plans and profiles were prepared for overhead bridges on the east and west streets affected. Messrs. Waddell & Harrington submitted an estimate for the construction of the bridges. A money by-law was submited in January, 1912, and defeated by the rate payers. Some time after this a comprehensive scheme of grades was laid out, and plans and estimates for these bridges were prepared in the city engineer's office to submit to the Railway Commission in July last. The scheme was approved, and the cost apportioned between the various parties interested. The final scheme consists of bridges over Hastings, Pender, Keefer and Harris streets, respectively. It is proposed to construct these bridges, with the exception of the Hastings street bridge in reinforced concrete. The Hastings street bridge will be a combination of reinforced concrete and steel plate girders. The approaches in all bridges will be constructed with reinforced concrete retaining walls and earth fills. The total estimate of cost of these bridges is $618,700. $15,000 was provided from the Railway Crossings Fund, towards the cost of the work.

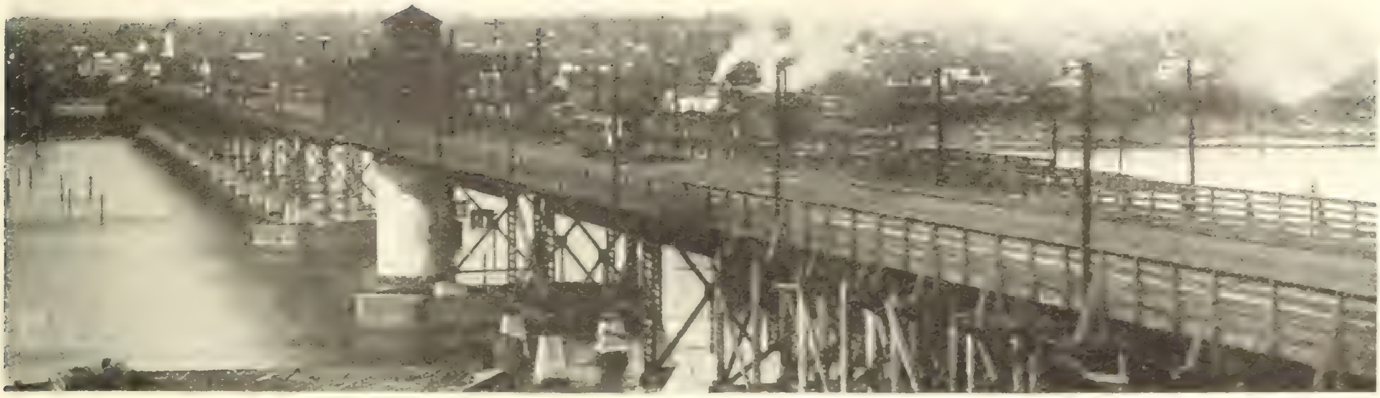
Stanley Park Causeway

The need of a bridge or causeway to replace the existing old wooden trestle at the entrance to Stanley

Construction of the Cambie St. Bridge—View of north steel trestle, showing type of traveller used



General layout Granville Street Bridge, Vancouver



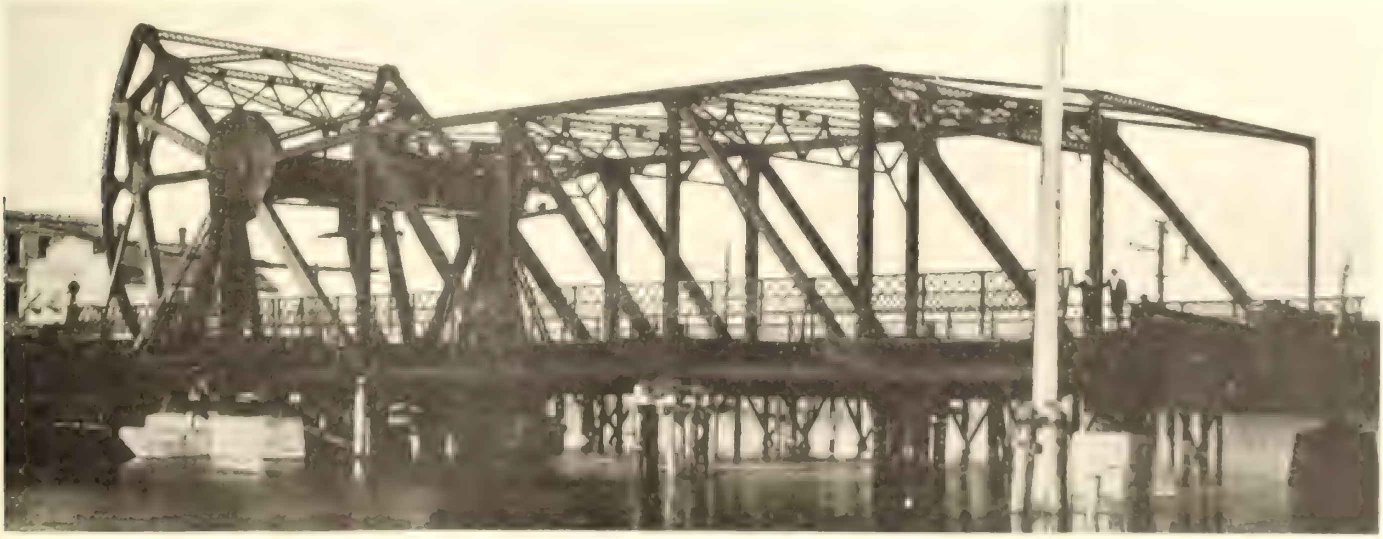
Granville St. Bridge, Vancouver. This structure consists of 264-ft. through swing span with steel trestle at each side. Total length of the bridge is 3,290 feet. Engineers, Waddell & Harrington. Contractors for the substructure, Armstrong, Morrison & Co.; for the superstructure, Dominion Bridge Co., Montreal

Park has long been felt by the citizens of Vancouver. In November, 1909, Mr. G. H. Webster, consulting engineer, submitted a proposal which consisted of making a rock fill across the east end of Coal Harbor, and filling in with earth until a width of 100 feet was obtained. The cost of this work was estimated by Mr. Webster at $95,686. Various schemes were outlined on this basis until the end of 1911 when it was thought advisable to obtain definite data to work upon. A complete topographical survey was made, and borings taken along the site of the proposed rock fill. As a result of this information an entirely new scheme was laid out involving the construction of a concrete sea wall instead of the rock fill before mentioned. An estimate was made up on this basis amounting to $180,000. As the amount of money available under the present by-law is only $160,000, the work has in consequence been somewhat delayed. The Stanley Park Commissioners engaged Mr. Thos. Mawson, Hon. F.R.I.B.A., English Landscape Architect, to submit designs for the treatment of the entrance to Stanley Park. Four designs were submitted, the one finally chosen by the Park Commissioners has for its main feature a shallow circular pond, the centre of which is on the centre line of Georgia street, produced in a westward direction. The estimated cost of constructing this pond and making the required wall and earth fill alone would amount to about $705,000.

Georgia-Harris Viaduct

This structure, tenders for which are now under consideration, will reach from the west side of Main street in a westerly direction, crossing over an arm of False Creek, the properties of the Canadian Northern Railway, British Columbia Electric Railway, and the Canadian Pacific Railway successively until it reaches the present eastern end of Georgia street. It will form, when completed, a valuable additional artery for east and west bound traffic of all kinds, and will materially relieve the pressure on Hastings and Pender streets, which streets at present have to accommodate all such traffic north of False Creek. An approach from the eastern end of Dunsmuir street to the viaduct also forms part of the final scheme.

The necessity of such a structure has been felt for some considerable time, and early in 1912 it was decided to have an open competition, four substantial prizes being awarded. A large number of designs were received and closely examined, the first prize being awarded to Mr. C. A. P. Turner, M. Can. Soc. C.E.,



Westminster Ave. Bridge, Vancouver. A 128-ft. bascule span at the middle of the crossing, flanked at each end by a 75-ft. deck plate girder span, with an embankment at each approach. Engineers, Waddell & Harrington, Kansas City. Contractors, Armstrong, Morrison & Co., and Dominion Bridge Co.

M. Am. Soc. C.E., of Winnipeg, inventor and patentee of the "Mushroom" system of reinforced concrete construction.

The total length of the structure is 2,854 feet, its total outside width 66 feet, comprising a central roadway 52 feet wide carrying a double track for street cars, and two six-foot sidewalks. The arm of False Creek is crossed by a single arch span of 111 feet clear, and the rest of the viaduct is comprised of the "Mushroom" Slab system, with the exception of about 1,000 feet at the western end, which is carried by concrete covered steel deck trusses.

The question of the arrangement of the column footings and piers has required considerable attention, in order to allow for the existing rail and road traffic underneath the viaduct, and at the same time provide for proposed alterations and extensions of track by the various railway companies affected. This, however, has been at length satisfactorily arranged and construction will begin as soon as the plans are approved, and tenders for the work accepted. The total cost of the structure is $474,000.

Harbor Development

VANCOUVER Harbor is rated as one of three best in the ports of the world in point of natural advantages. Burrard Inlet upon which are situated Vancouver, North Vancouver and Port Moody, extends from the First Narrows eastward for a distance of 12 miles. An off-shoot of the Inlet known as the North Arm, extends in a northerly direction from the upper reaches of the Inlet for a distance of seven miles. The harbor proper has a shore line of 25 miles and an area of at least 20 square miles of deep water, the inlet averaging 2¼ miles in depth ranging from 25 feet along shore to 30 fathoms in the stream. The average tide is about 13½ feet.

The equipment already in use includes Piers A and B, and the five berths of the Canadian Pacific Railway Company, and the docks, wharves and piers of the R. V. Winch Company, Union Steamship Company, Johnson Wharf Company, Evans Coleman & Evans, Grand Trunk Pacific Railway Company, B.C. Marine Railways and the North Vancouver wharf of the Lonsdale Estate.

The shipping interests of Vancouver are making active preparations for the opening of the Panama Canal. Construction is now advancing on a system of piers and overhead approaches of the C.P.R. to cost approximately $1,000,000. An extensive system of concrete piers for the Great Northern Railway Company; wharves and warehouses for Hon. F. Carter-Cotton; and a system of concrete piers for the Lonsdale Estate Company on the North Vancouver waterfront

False Creek, a bed of shallow salt water that bisects Vancouver's commercial area is to be reclaimed for use as yards, trackage and industrial sites and the Union passenger terminals of three great transcontinental railway systems.

Last summer the Dominion Government instituted a complete survey of Burrard Inlet and the neighboring waterways, Messrs. Davy and Lafleur, of the Public Works Department, being entrusted with the work. The work done by these engineers was the precursor of the Dominion Government's recent plan to assist in the development of harbor facilities at Vancouver. A public wharf will be provided on a site bounded by Park and Salisbury Drives, the C.P.R. tracks and Burrard Inlet, having a frontage of 632 feet.

Construction will commence at an early date on the new dock which will be between 850 feet and 1,000 feet in length, and 250 feet in width. The piers and foundations will be of reinforced concrete construction. Three freight sheds will be built on this dock, and a large emigration shed will be erected on the shore end of the dock. The machinery to be installed for the handling of cargoes will be of the most up-to-date description.

Tenders are now being called by the Dominion Government for the dredging of False Creek from Main street to the mouth. A channel 300 feet wide and 20 feet deep at low water is proposed.

Further improvements are under consideration at Ottawa, and it is expected that an extensive programme of harbor development at Vancouver will be announced at an early date. An appropriation of $5,000,000 has been made for present requirements at Vancouver and North Vancouver. The harbor and government-owned dock, as well as other harbor facilities, will come under the direction of the harbor commission, which the Dominion Government proposes to establish for Vancouver and North Vancouver. This bill is to be modelled on the same lines as the Montreal Harbor Bill.

Reinforced concrete buoys have recently been built for the public works department of the city of Kingston, Jamaica. The buoys are cylindrical, the bottom being concave, thus affording protection for the eyebolt to which the mooring chain is attached. The sides are built up of curved Hy-Rib, with the ribs running horizontally, and the reinforcing bars in the bottom are built up inside the Hy-Rib shell. The top is a solid slab, the reinforcement being carried down the sides so as to provide a suitable bond. The sides are plastered inside and outside to a total thickness of 3 in. The concrete and cement plaster is waterproofed with paste. A temporary manhole is left in the top for the removal of the interior centering and for convenience in lowering. The cover of the manhole is subsequently grouted into place. A small pump hole fitted with a brass screw cap is also provided on the top, as the buoys are said to sometimes leak for a few days after placing. The completed buoys weigh about 5 tons each and carry about 1 ton of ballast. Their cost is said to be somewhat less than one-half that of steel buoys of the same size.

A narrow reinforced concrete building, ten storeys high, with a front width of 23 feet 6 inches, and a depth of 100 feet, has recently been completed in Toronto. The floor beams span the entire width of the building, and on account of its narrow section the side walls were built without pilasters. These walls are 22 inches wide at the basement floor level and 14 inches wide at the top. Opposite the floor beams, the reinforcement in the wall section is concentrated over a three-foot section, thus virtually making a series of columns of the same thickness as the wall. Knee braces were used under the ends of the beams at the first four floors, and in the first seven floors the reinforcement of the floor beams is threaded and bolted to plate washers anchored in the wall section. The front of the building, between floors, is devoted to window area, and the exposed concrete surfaces are faced with glazed terra cotta.

Head Office and Terminal Building of the B. C. Electric Railway Company, Limited, Vancouver

Electrical Operations of the B. C. E. R.

THE handsome building which accommodates the head office and interurban tram terminal of the British Columbia Electric Railway Company, Limited, was erected last summer at Vancouver at a total cost of $450,000. The building is located in the heart of the business section at the corner of Carral and Hastings streets. The site is very irregular in shape owing to the fact that the C. P. R. line, which crosses the city, extends along the west side of the tract.

The building has a frontage of 190 feet on Carral street, 70 feet on Hastings street, 216 feet along the C. P. R. tracks, and 200 feet on the south side. The block stands 80 feet in height, provision having been made for a basement, high ground floor, and five storeys for office purposes.

From an architectural point of view the building possesses many excellent features. It is of reinforced concrete construction, with a granite base on the ground level. On the Hastings, Carral and C. P. R. frontages it is faced with wirecut light grey pressed brick, this face being relieved with rich ornamentation of terra cotta. Further ornamentation is given the street elevations by the placing of ornamental iron face plates on the structure, forming the sills and lintels of the windows. Over the pilasters on the ground floor, is placed a heavy 4-inch belt course of terra cotta, and above the level of the fourth storey is a heavy cornice, 5 feet high, and with a projection of 3 feet for the illumination of the structure by powerful electric lights located in the cove of this cornice. In the basement, which is 9 ft. 9 in. in height, are located rooms for trainmen, lavatories, heating plant and storage rooms.

The ground floor is 24 feet in height. On the Hastings street frontage, provision is made for the interurban tram trackage, leading to the large train shed on the west side of the building. Three entrances to this train platform are provided from Carall street. The shed itself is 50 feet by 128 feet in size. Its roof is formed on five heavy steel trusses in which girders 5 ft. 6 in. in depth and giving a span of over 50 feet are used. The office quarters are built over the Hastings street frontage of the train shed; but the greater part of the area is left clear above, being lighted through a roof of heavy wire glass.

The first, second, and third storeys are each 12 feet high and the fourth and fifth storeys are about 11 feet high. About 15,000 sq. ft. of floor space is provided on each of the office floors. Throughout, the structure was built according to the highest standard of fireproof construction. The wood finish of the interior is of oak. The plumbing is of the Durham type, and the heating installation of the steam vacuum type.

The plans for the building were prepared by Messrs. Somervell & Putnam, and the work of construction was carried on by Messrs. McDonald & Wilson under the direction of Mr. R. W. Bridge, who acted as Inspector of the structure for the British Columbia Electric Railway Company.

Generating Equipment

The British Columbia Electric Railway Company, Limited, provides the street railway system for the city of Vancouver and its suburbs. The company also provides current for lighting the city streets and the light and power service for the general public. Through a subsidiary concern, the Vancouver Gas Company, the co-operation also provides the gas supply for the Vancouver public.

The B. C. Electric's main generating station is located on the North Arm of Burrard Inlet, about sixteen miles from Vancouver. It embraces a project for the utilization of the water powers of Lake Coquitlam and Lake Buntzen at generating stations situated on the shore of the North Arm of Burrard Inlet.

General Plan.—The water from Lake Coquitlam is taken through a hydraulic tunnel over two miles in length to Lake Buntzen, which is used as a balancing reservoir. From Lake Buntzen the supply is taken directly to the power house on the North Arm of the Inlet, being delivered at the waterwheels in the generating stations at a head of 400 feet.

Lake Coquitlam.—This lake lies almost directly east of the site of the power house on the North Arm, from which it is separated by a high mountain. It is seven miles in length, and has an average width of 2,500 feet, its approximate area being 2,300 acres, and its watershed about 105 square miles. The original elevation of the lake was 432 feet, which was raised by means of a temporary rock-filled crib dam to 443 feet. At the present time operations are well advanced on the substitution for this temporary dam of a permanent hydraulic earth-filled dam, 90 feet in height and containing 530,000 cubic yards of material, which will raise the level of the lake to 503 feet and give it an area of 3,075 acres.

Hydraulic Tunnel.—The hydraulic tunnel connecting Lake Coquitlam with Lake Buntzen is 12,775 feet in length. It is driven through a mountain of solid granite, the height of which is 4,000 feet. When first driven, the tunnel had a cross section area of eighty-one square feet, but during the last two years it has been enlarged so that it now has a cross section of 192 square feet. This plan of enlarging the tunnel was carried out to provide for the increased flow of water when the great dam at the mouth of Lake Coquitlam was completed. In connection with the enlargement, new head gates, etc., of a permanent type have been installed at the Coquitlam intake.

Lake Buntzen.—This lake has an area of 500 acres, a watershed of about seven square miles, and is located at an elevation of about 400 feet. At the outlet of the lake the company has constructed a concrete dam from which, with a drop of 400 feet, the water is taken to the power houses on the Inlet shore, about 2,000 feet away.

No. 1 Power House.—Steel pipes convey the water from Lake Buntzen to No. 1 power house. In this generating plant there is at present in operation hydraulic and electrical equipment of a total capacity of 43,500 horse power, the equipment consisting of four units of 3,000 horse power each, and three units of 10,500 horse power each. The water wheels are of the impulse type, some having been supplied by the Pelton Waterwheel Company, of San Francisco, and others provided by the John McDougall Company, of Montreal, under license from the Abner Doble Company, of San Francisco. The electrical generators have been supplied by the Canadian General Electric Company, the Canadian Westinghouse Company, and the Dick, Kerr Company.

No. 2 Power House.—This generating station is at present under construction, its location being half a mile south of No. 1 station. It is anticipated that the first unit of the plant will be in operation about the middle of April. The water from Lake Buntzen will be taken to this power house through a concrete-lined tunnel, fifteen feet in diameter and 2,000 feet in length, the flow being controlled by Doble needle nozzle intake valves. From the western end of the tunnel, steel pipes, eight feet six inches in diameter and 500 feet in length, controlled by butterfly gate valves, convey the water to the power house. Here it will be distributed to the water wheels by hydraulically-operated gate valves. This generating station will have a total capacity of 42,000 horse power. The waterwheels are to be of the impulse type, built by the John McDougall Company, of Montreal, and designed by Mr. W. A. Doble, of the Pelton Waterwheel Company, of San Francisco. The electrical equipment will be supplied by the Dick ,Kerr Company, of London, England, the units being built at the firm's works at Preston, Lancashire. Each of the three generators for which the company's programme calls, will have a full-load capacity of 8,900 kw. In Vancouver the company has a steam auxiliary plant for use in case of emergency, with a possible output of 20,000 horse power.

Favorable Location.—The company's plant on the North Arm is located favorably, not only for the development of electrical energy, but also for the delivery of the heavy machinery and other supplies incidental to the construction and operation of such plants. At the company's wharf, adjoining the power house, the material is delivered in the original cars in which shipment was made, the Canadian Pacific Railway frequently sending its transfer barge, 45 feet wide, 190 feet long and with a capacity of twelve full-size cars, to the point. By means of an apron track the cars are run from the barge to the concrete wharf and into the power house, where the machinery, etc., may be conveniently unloaded by the aid of the powerful electric cranes which form part of the station equipment.

Distribution System.—The company's transmission line spans Burrard Inlet at the Second Narrows, and carries current to the North Vancouver substation. The wires are here carried on high masts, the central pair being each 200 feet in height and providing for a span of 1,000 feet. At Barnet on the hill back of the village, the steel towers which support the main transmission lines from the North Arm generating stations are situated. These towers, located on either side of the Inlet, provide for a span of over 3,000 feet, the wires crossing the waterway at an elevation of 132 feet.

Tram System

The Vancouver division of the B. C. Electric tram system represents approximately 88.12 miles of single track, covering all parts of the city and extending into the suburban districts. At the present time, over 170 cars are in service on this branch of the system, and 65 additional cars are under contract for delivery during the early part of 1913. All the cars are of the double truck type, of late form of construction, and operated on the "pay-as-you-enter" system. Last year over 45,000,000 passengers were carried on the Vancouver lines.

The company operates a system of interurban lines connecting Vancouver with other parts of the mainland. Between Vancouver and New Westminster three lines, covering separate sections of country, are operated, the main line offering a 15-minute service between the cities. The company also operate a line from Vancouver to Chilliwack, traversing the South Fraser Valley and 76 miles in length, thus forming the longest interurban tram line in the Dominion.

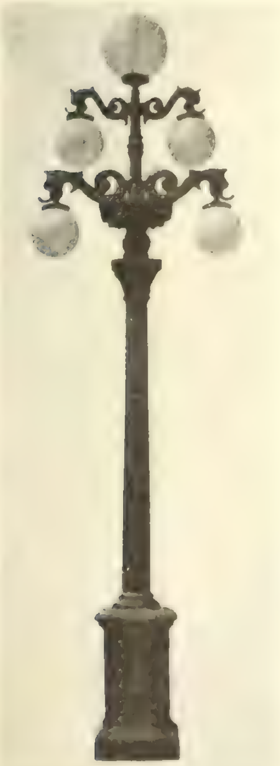
The light and power service of the company covers every part of Vancouver and adjacent districts. The company has a contract for lighting the streets of Vancouver and the following districts lying immediately adjacent: South Vancouver, Point Grey, Burnaby and North Vancouver. In the field of private lighting it now has on its books an enrollment of approximately 27,000 customers in Vancouver. Its business in the line of supplying power for industrial purposes has been increasing rapidly of recent years, its connecting load for this class of business in the city now being about 22,000 horse power.

The Vancouver Gas Company has about 125 miles of mains laid throughout the city, its number of connections at the present time being approximately 14,000.

The British Columbia Electric Railway Company is an English concern with head office in London, England, and headquarters in British Columbia at Vancouver, B.C. The entire operations of the company cover a district of 1,600 square miles in the vicinity of Vancouver, as well as the South Eastern section of Vancouver Island, embracing Victoria, B.C., and adjacent districts. The capital investment of the company in British Columbia is now over $36,000,000 and during the past season the monthly pay roll of the company covers over 5,000 employees. The general manager of the company is R. H. Sperling, Esq., who is located at the head office in Vancouver.

Interesting Street Lighting Development

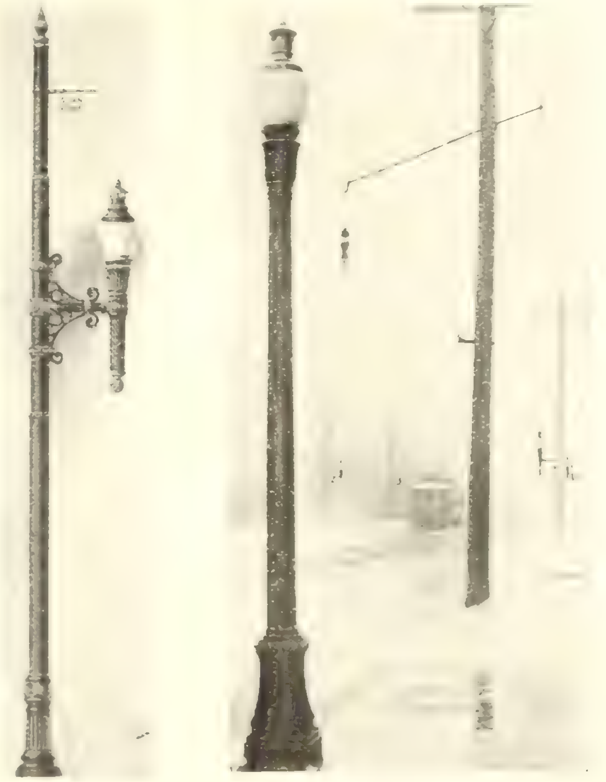
VANCOUVER'S first installation of ornamental lighting dates back to the year 1906, when 26 one-light standards were erected on Beach avenue at English Bay between Bidwell and Chilco streets. Four years later those standards were changed from one-light to the present three-light type, using three 60-watt mazda lamps, and later an additional 22 standards were added, bringing the total number of standards at this location to 48 in all. In March, 1910, several prominent citizens interested in Hastings and Granville streets, formed a committee, their object being to interest the property owners in the installing of ornamental cluster lighting on these two streets. Through the untiring efforts of the Granville Street Property Owners' Association, work on Granville street was commenced in the fall of 1910 and was completed in March, 1911. The work was carried out by the Electrical Construction Company, of Vancouver, the entire cost of same being paid by the benefitting property owners. Arrangements were made with the city to take over this installation and pay for lighting and maintenance of same for a period of five years.



Vancouver 5-light Standard

The good example shown by Granville street property owners was quickly followed by the erection of 96 standards on Hastings St. As the Granville street standards were found to be unsuitable for the multiple system of lighting, a new design was necessary, and through the good offices of the late Mr. J. A. McCrossan the present standard was devised, which after due trial, was found to be the most suitable standard for the requirements, and therefore was recognized as the universal one for any future ornamental lighting throughout the city.

Before this work was completed several petitions had been received by the city council asking for the installation of ornamental lighting on other business sections of the city, and after due consideration the council, in order to facilitate the work, passed a local improvement by-law on the 17th of July, 1911. This by-law designated certain streets in the city of Vancouver upon which ornamental standard lighting should be installed and lighted, and that the cost of same should be defrayed by special rate upon the assessed property on each street, according to the frontage thereon. An amendment to this by-law was passed by the council in September, 1911, to the effect that if a majority of the council considered it inequitable to assess the whole cost of the lighting and maintenance against the property owners benefitted, the council may defray part of this cost, but not more than 25 per cent. of the total, this to be paid out of the general funds of the city. In December, 1911, a contract was awarded to Waugh, Misner & Bailey to install ornamental lighting on Pender street, Main street and Cordova street, and on Hastings street from Main street to Jackson avenue. This installation comprising a total of 285 five-light standards, and covering an approximate distance of 12,300 feet, was completed in May, 1912.



Type of arc lamps being tried out in Vancouver

In retrospect it may be said that where three years ago Vancouver did not have a strictly ornamental tungsten street lighting system, at the present time it has about seven miles of streets well lighted by this new system, the total number of standards in use at the end of 1912 being 621.

Underground is naturally the system adopted to supply each standard. On Granville and Hastings streets a 2½-in. fibre conduit is laid in the sidewalk and imbedded in concrete. On the other streets sher-

[illegible] conduit was used, and standard lead covered cable drawn through.

The spacing of the standards varies from 85 feet to 100 feet, according to the length of the block, giving a candle power of from 5 c.p. to 5.8 c.p. per lineal foot of the street. It is always the endeavor to place standards at each corner of street intersections wherever possible.

Two systems of lighting are in use:—The Granville street installation consists of 225 5-light standards. One hundred and thirteen of these are equipped with five 6.6 ampere series tungsten lamps connected in multiple at 11.3 volts. The service supplying the lighting is 110/220 volts, 3-wire, each service supplying approximately 12 posts on one circuit. The service leads are brought in conduit down the poles in nearby lanes, through the underground ducts and connected in multiple through transformers, located in the base of each standard and having a ratio of ten to one. The top lamp is in a 16-in. opalescent globe, and the side lamps are in 12-inch spherical opalescents.

With the exception of the lighting of the Granville street and Connaught Bridge, all standards are equipped with five 100-watt tungsten lamps, wired in multiple at 110 volts on 3-wire system. Granville street bridge lighting consists of 70 2-light stem brackets, the lamps themselves being 11.3 volts, 6.6 amp. Twenty lamps are wired in series with automatic cutouts for each lamp. Ten similar brackets placed on the drawbridge are two in series with 110 volt, 100 watt tungsten lamps. The Connaught Bridge lighting system consists of 88 one-light brackets all wired in series having lamps of 11.3 volts, 6.6 amps., fixed in G. E. series socket with film cutout. Regulation of this bridge lighting is secured by means of a regulator located in the Incinerator close by. This system was installed by the Electrical Construction Company and completed in December, 1911.

A new departure has been decided upon for any future extensions and that is the utilizing of steel armored cable for all underground work. This will not only ensure a decided saving in costs, both in labor and material, but should obviate a great many of the minor troubles common to the usual conduit system. The firm of Waugh, Misner & Bailey is now installing 219 standards on the new system. These are to be located on Main street, Hastings street, Harris street and Granville street.

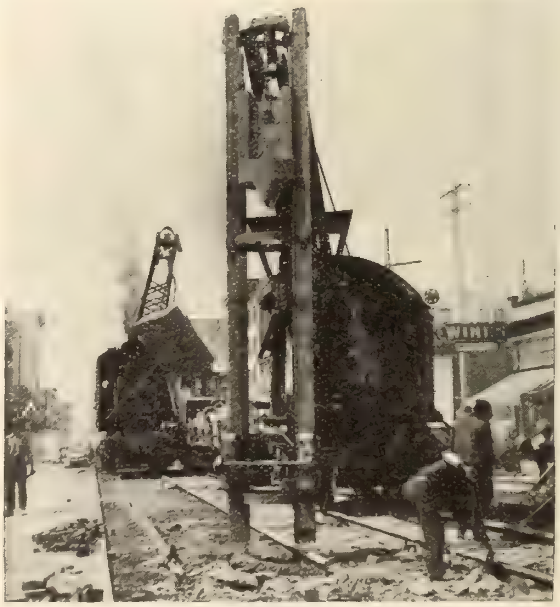
The engineering department of this city are now providing a space of 6 inches on the boulevards of all streets where there is any likelihood of ornamental lighting being installed. This will also tend to reduce the cost of the installations, and at the same time will prevent the otherwise necessary defacing of the concrete sidewalks.

The foregoing will show the grasp the city council has taken on the ornamental cluster lighting of their streets, and while always anxious to push this style of lighting, they are at the same time always on the outlook for something better suited to their requirements.

Last year the British Columbia Electric Railway Company constructed a line of double tracks through a number of streets in Victoria, B.C., which had already been paved on a concrete foundation. The tracks were put down quite substantially on a reinforced concrete sub-foundation, on which the roadway proper was constructed. In breaking up the concrete of the paving which had previously been laid, the railroad used a somewhat unique appliance. This consisted of the guides of a pile driver suspended from the end of a railway crane, by which they could be swung from one side of the right of way to the other; and instead of the ordinary hammer was a heavy inverted cone with an obtuse point, somewhat resembling a boy's top in shape. This was allowed to fall on to the concrete in the same way as a pile driver hammer is dropped, the point entering into and shattering the concrete so that it could readily be removed by hand.

Building permits for the months of January and February at Fort William amounted to $569,700, as compared with $498,150 for the corresponding months of last year.

Track reconstruction. Breaking up bed and loading debris with electric crane.



Track reconstruction. Novel apparatus employed in breaking up the pavement.

Building Active at the Federal Capital

Progress Notes on the Principal Work—Remedial Measures Recommended by Experts Engaged to Report on the Water Supply

Correspondence of The Contract Record

BUILDING operations in Ottawa are very active at the present time, the mildness of the winter being accountable for this. Within six months there will have been completed ten new fireproof structures, ranging from a modest apartment house to a skyscraper. These all told will cover nearly two acres of ground and will have cost nearly a million and a quarter dollars. The Building Prospector reports a large increase for the first two months of this year over 1911, and altogether the outlook for 1913 is very bright. Including the new Government Buildings which will be commenced this year in Ottawa, the estimated cost of construction work should run almost to the six million mark—nearly double that of last year.

Progress on Various Buildings

The new Masonic Temple is being erected on Metcalfe street at a cost of nearly $100,000. This structure covers a space 61 feet by 92 feet, and rises to five storeys in height. It is constructed of reinforced concrete throughout and is absolutely fireproof. The facing work, which is at present nearing completion, is of sandstone. One passenger elevator will be installed, Mr. J. Albert Ewart is the architect, and Mr. Alex. Garvock the builder. The temple is being erected for the Ottawa Masonic Temple, Limited, of which Mr. William Northwood is president, and Mr. H. W. Wilson, secretary.

The cornice work on the new Booth Building on Sparks street will be commenced in a few days. Construction work on this building has been going on steadily throughout the winter months, and the offices will be ready by May 1st. The building is 100 feet by 70 feet and rises eight storeys. The owners, Mr. C. J. Booth and Mr. J. L. Holbrook, at first took out a permit to build only five storeys, but upon reconsideration decided to increase the height to eight, as it costs only half as much to add the three storeys now as it would after the structure had been finished. The building will cost $150,000, and will operate two elevators. It will have all modern appointments—a vacuum cleaning system, filtration apparatus and heating plant. The interior of the building has a floor space equal to an acre and a half. Mr. J. Albert Ewart is the architect, and Mr. Alex. Garvock the builder.

The steelwork for the Union Bank building on Sparks street, erected for Blackburn Bros., is now completed, and the facing and internal work will go ahead as soon as better weather sets in. This building is the largest on Sparks street, being ten storeys high (the limit for Ottawa). The cost when completed will be nearly $600,000. Mr. Noffke is the architect.

Finishing work is proceeding on the new wing of the Lady Grey Tuberculosis Hospital. This wing is the gift of the Hon. George H. Perley and will cost approximately $50,000. The building is of solid brick construction, with shingle roof, and is heated with steam. Commodious sun rooms and verandahs are provided for the patients. The city will construct the septic tank necessary for this wing, as the drainage of the part of the city whereon it is built is not far enough forward to connect up with.

Customs House, Sussex Street

The excavation work is practically completed for this new Government building. The Public Works Department are doing the work by day labor, and have had two steam drills and a steam shovel at work during the excavation. The rock excavated is being crushed on the site and will be used later for the foundations of the building. About one hundred men have been employed during the winter months. The cost of the structure will be $500,000. Tenders are expected to be awarded in a few days. The building was designed by the Public Works Department.

Temporary Intake Pipe

Great difficulty is being experienced in the concreting around the joints of the temporary intake pipe owing to the large amount of anchor ice encountered. The ice goes right down to the bottom of the river, and has to be dug out and placed on the surface before the diver can go down. The pumps on Lemieux Island are not working yet, owing to the concrete around the joints taking such a time to set.

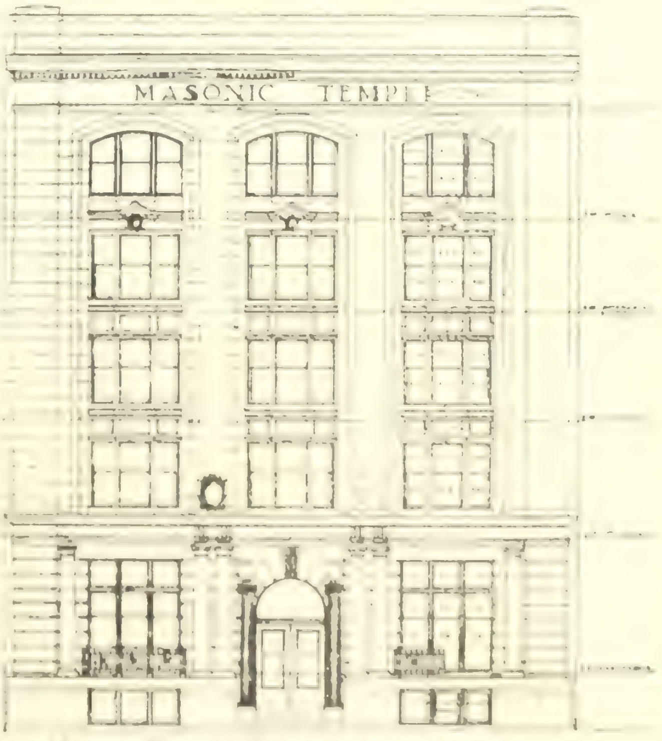
The Permanent and Temporary Water Supply

Sir Alexander Binnie and Dr. A. C. Houston have practically settled the water problem of Ottawa. As anticipated they have told the Corporation to go to the hills and secure "a bountiful supply of clear and wholesome lake water available for the needs of Ottawa for many years to come." They further recommend the Corporation to adopt certain remedial measures for the temporary supply. These are as follows:—

(a) The water in the pipe line between the intake and the pumping station should be kept uniformly under pressure.

(b) That a sedimentation basin should be constructed by connecting the piers at the intake with the high land on Lemieux Island. Estimated cost $17,000.

(c) That the double chlorination treatment now in operation should be stopped, and a single treatment of the water as it enters the basin substituted, thus enabling the present



Masonic Temple, Ottawa, now under construction
Architect, Mr. J. A. Stewart

dose to be reduced, or, if the same dose were retained, the treatment would be rendered much more satisfactory, than is the case at present.

(4) Steps should at once be taken to reduce the extravagant rate of consumption per head of the population.

Measures have already been adopted to have these four recommendations carried out. The sedimentation basin will go ahead immediately, and the Acting Waterworks Engineer will have charge of the construction

City Supplies for 1913

Sand, Capt. L. J. Smith, Ottawa, $1.06½ cu. yd.

Cement, T. Sidney Kirby & Company, Ottawa, 51½c per bbl.

Plank and cedar, McAuliffe Davis Company, Ottawa, $10,-250

Castings, T. Lawson & Sons, Ottawa, $2.85 per cwt.

Brick, Peerless Brick & Tile Company, Ottawa, $10.90 per M.

The stone setts and broken stone will be purchased in the open market as the prices sent in were about forty per cent. higher than last year. The city may operate its own crusher and quarry.

The waterworks supplies have been awarded to the following firms:—

Brass goods, Robert Mitchell Company, Montreal .	$2,456.30
Cast iron pipe, Canada Iron Corporation, Ltd.	16,655.42
Hydrants, Thos. Lawson & Sons, Ltd., Ottawa ...	2,487.50
Oils and grease, Capital Warehousing Co., Ottawa	407.50
Lead pipe and pig lead, Capital Hardware Co.,.. Ottawa	2,353.10
Special pipe castings, T. Lawson & Sons, Ltd	$3.50 per 100 lbs

Public Swimming Baths

Application will be made to the Legislature for a debenture for $50,000 for the erection of a Public Swimming Bath. No site will be purchased, neither will the architect be chosen, until the Provincial Authorities have approved of the expenditure.

Lumber and Brick

The price of lumber this year will be about fifteen per cent. higher than 1912, owing to the light cut of lumber in Ontario this season. Hemlock, which is being largely used in the erection of buildings, has gone up about $5 a thousand. It is claimed that No. 1 hemlock to-day is no better than No. 2 a year ago. There has been a general advance on all pine prices. Window frames, sashes and doors all cost more than a year ago, and the price of scantlings has gone up from fifty to seventy per cent. Spruce flooring has also increased in price considerably.

Brick, as well as several other building materials, has advanced in price greatly and may become very scarce in Ottawa this year, owing to the huge amount of contemplated buildings. It is anticipated that a large amount of brick will require to be bought outside the city. With increased production in Ottawa the prices may be lowered somewhat. Several local men formed a syndicate, and bought three hundred acres of land at Hull, Que., about two miles from Ottawa, where they intended building a brick plant, but seemingly nothing further has been done.—L. H.

Messrs. Viau & Venne, architects, Montreal, have prepared plans for a Roman Catholic school in Outremont. The building will front 185 feet on Outremont avenue, running 76 feet on Lajoie avenue, and is estimated to cost $135,000. Built of concrete, granite, brick, terra cotta, and steel, it will be thoroughly fireproof throughout. Special attention has been paid to heating and ventilation, and this has been arranged in the combination system of the Canadian Domestic Engineering Company of Montreal. The necessary machinery will be in an annex, detached from the main building. Fire escapes will be provided for each series of class rooms, which are planned on the latest and most approved designs. The school will provide accommodation for 24 classes, and about 1,500 scholars, and under the three main flats will be play-rooms to the full extent of the building. The general contract has been awarded to Mr. Ulric Boileau.

Important Projects at Winnipeg

Correspondence of The Contract Record

Winnipeg, March 15th, 1913.

PARAMOUNT in importance of recent events is the award of the design of Winnipeg's new city hall to Clemesha & Portnall, of Regina. The plans call for a six-storey building estimated to cost three million dollars, for which a by-law is to be submitted in June.

Operations on the construction of a large reservoir, of steel and concrete construction, will be commenced early in the spring, tenders having been called.

The excavation for the new hotel on the northwest corner of Notre Dame and Albert is nearing completion. This structure will be three storeys high and will cost approximately $100,000. It will have a frontage of 99 ft. on Albert street and 93 ft. on Notre Dame avenue. Mr. Geo. Skinner, of the Grange Hotel, is the proprietor, and Messrs. Carter-Halls-Aldinger are the contractors.

Great West Permanent Company's Building

On the Great West Permanent Building, the steel is up to the third storey. This structure will be a 13-storey building of structural steel frame. Only nine storeys are to be built at present. The frontage on Main street is 50 ft. and the depth is 120 ft. The building rests on 36 concrete caissons, which were carried down to bed rock at an average depth of 30 ft. The Great West Permanent Company will occupy the first two storeys. The ground floor will be the main one and is finished in marble and bronze, the floor being of marble. To give a large unobstructed area on this floor, one row of columns has been cut out and the columns above are carried on trusses. The vaults are carried from the basement to the top of the second storey and are fire and burglar proof. The front of the building will be finished with a granite base and terra cotta above. The sides and rear will be faced with brick curtain walls. The structure throughout will be thoroughly fireproof. The doors and partitions are hollow sheet metal, and the windows hollow metal sash, with plate wire glass. The elevators will be of the fireproof traction type. Two will be installed at present with provision for a third when the additional four storeys are completed. The ground floor is marble and the floors above are maple finish carried on a bed of concrete laid over hollow floor tile. The corridors have marble floors and a seven-foot marble wainscoting. The contract calls for the building to be ready for occupation by September 1st of this year. Mr. J. H. G. Russell, of this city, is the architect, and the Carter-Halls-Aldinger Company, are the contractors. The Dominion Bridge Company are doing the steel work.

Street Railway Extensions

Under the street railway by-law, the city may require the company to construct certain lines each year and the following list gives the requisition for 1913. Arlington street, from Milburn to Mountain; Mountain avenue, from McGregor to Arlington; Talbot avenue, from Strathcona to Roland; Portage avenue, from Hargrave to Maryland; Pembina street, from Subway to Kylmore avenue; Sargent avenue, from Arlington to Erin and Notre Dame avenue, from the end of the present track to Keewatin street. The lines are in operation on Portage avenue to Pembina street, but as these streets are to be paved with asphalt the tracks will have to be re-laid.—L. M.

Mainly Constructional

The News in Brief—From Coast to Coast

The premises of Miller Bros. & Toms, engineers, Montreal, have been destroyed by fire, entailing a loss of about $60,000.

Mild weather has permitted the brick plants in and about Toronto to continue operations without cessation all winter. This is an unprecedented record.

The contract for building the addition to the three-million bushel elevator of the C. P. R. at Fort William has been awarded to the Canadian Stewart Company.

It is expected that the new quarry of the Ontario Lime Company at Owen Sound will be running at full swing this summer. It is the intention to turn out forty carloads a day.

Arrangements are being made to extend the Temiskaming & Northern Ontario Railway to James Bay and a hydrographic survey party has proceeded to this point to take surveys.

Representations have been made by the Montreal Board of Trade to the Metropolitan Parks Commission on the question of a definite plan for laying out roads and streets in Montreal.

It is estimated that buildings almost to the value of half a million dollars will be erected on Queen street, Ottawa, this year. The announcement of these buildings has resulted in unusual activity along this street.

Maisonneuve intends to expend $600,000 on roads and pavings this year. Sidewalks in certain thoroughfares are to be laid in blocks with a view to the laying of conduits for telephone and electric light wires in the near future.

Preparations are being made for the erection of a two-million-dollar grain elevator at Louise Docks, Quebec, the contract for which has been awarded by the Harbour Commissioners to the Canadian Stewart Company, Limited.

The $600,000 which was asked for by the Board of Education of Toronto, for the new Technical School, was recently granted them by the City Council. The school is planned to accommodate 7,500 pupils and will take two years to build.

At a meeting of the Montreal Master Painters' Association, it was decided to increase the wages ten per cent., the new schedule to come into force on the 1st of April next. The old rate has been a sliding one, ranging from 25 to [illegible] cents per hour.

At the annual meeting of the Cedars Rapids Manufacturing Company, Montreal, Mr. Howard Murray presiding, the report of the construction work now proceeding was read, it being stated that satisfactory progress is being made. The retiring officers and directors were re-elected.

Work has been commenced on a department store building in Regina which will be the largest between Winnipeg and the Rocky Mountains. The store is 100 x 162 feet and will be five storeys high, of reinforced concrete. Its cost will approximate $500,000. The plans were drawn by Messrs. Brown & Vallance, of Montreal and Winnipeg.

The Canadian Chamber of Commerce in London has written to the Montreal Board of Trade asking to be supplied with information in regard to openings in the city for the establishment of joint factories by British firms, and also if it could be supplied with early notification of purchases intended to be made by public tender in Montreal.

Two hundred of the most prominent mechanical engineers of the United States will go to Europe this summer to attend the 54th annual meeting of the Verein deutscher Ingenieure in Leipzig and to inspect the educational and industrial establishments of Germany. The party will sail on June 10 on the Hamburg-American S.S. Victoria Luise.

Messrs. Hering & Fuller, of New York, have written to the Montreal Board of Control, stating that the progress on the filtration plant, of which they are the engineers, is not satisfactory. Unless better results are shown, the contractor, Mr. N. M. McLeod, cannot finish his contract on time, but the contractor states that he is confident of being able to do this.

Bids will be received until noon, April 15, by J. G. Sullivan, Chief Engineer, Western Lines of the Canadian Pacific Railway, Winnipeg, for the clearing, grubbing and grading of a division of the main line of the Canadian Pacific Railway Company in the Selkirk Mountains, from Six Mile Creek to Glacier, a distance of 17 miles. On this there is included a double track tunnel approximately 28,000 feet long.

A big improvement is to be carried out by the city of Montreal. This is the widening of St. Joseph Boulevard for which the preliminary sum of $733,000 has been passed. The scheme will cost much more, but the controllers hope to regain a part of the cost by re-selling a portion of the land at a higher price. The city are bound by a promise made to the Quebec Legislature to carry out the improvement.

Provided the steel is procurable, construction of the railway viaduct on the waterfront at Toronto will be commenced this spring. The heads of the Canadian Pacific Railway and Grand Trunk Railway have submitted in writing their proposals to the railway commission, and in these proposals have committed their companies to the construction of a six-track viaduct on the same terms as for the four-track viaduct.

It is intended by the Grey Nuns,, Montreal, to build a hospital on their property known as the "Reserve" bounded by Clarke avenue, St. Catherine street, Redfern street and Western avenue. It is stated that about one million dollars will be spent, and nothing will be spared to make the institution the best of its kind. The hospital will be open to all creeds and nationalities. A large number of private wards will be provided.

It was stated recently that the government of British Columbia would expend the sum of $200,000 on the construction of the sub-structure of the combined railway and traffic bridge, which for several years has been planned to be built over the Pitt River, a short distance to the north of the Canadian Pacific Railway bridge. It is expected that the total cost of the bridge, which is to be completed in 1915, will be $700,000.

From April 12th to 19th a real estate and builders' exhibition will be held in the Arena, Montreal. Already most of the space has been sold, and many of the principa' supply firms will be represented. The management offer for competition a silver cup, which will be awarded to the firm having the most attractive exhibit. This will not depend on the size of the space occupied by the exhibitor, but solely on the attractiveness of the design, etc.

It is proposed to build on the southeast corner of Peel street and St. Catherine street, Montreal, a number of stores, the property having been purchased by the Windsor Arcade, Limited, for $1,200,000. The alteration of the Montreal Harbour Commissioners' offices is under consideration, it being intended to build an annex to the offices. A ten-storey office building will be constructed on some land now occupied by old shops at the northeast corner of St. Gabriel and Notre Dame street.

The office staff and superintendents of Geo. W. Reed & Company, Limited, Montreal, held their sixth annual dinner at Cooper's restaurant. The dinner was presided over by

Mr. [illegible] president and managing director, who [illegible] to the happy relations existing between the management and staff resulting in the most successful year in the company's history. Speeches were also made by Mr. S. M. Baylis, vice-president, and other directors, as well as various members of the staff.

On the advice of the Chief Engineer of Montreal, the controllers have reported in favor of purchasing a minimum supply of 30,000 barrels of cement at $1.66 a barrel of 350 pounds, from the Canada Cement Company. The report of the controllers calls for the sum of $49,800. The company agrees to supply all the cement required, the foregoing amount to be the minimum. This large supply of cement is needed for the public works the city will undertake this summer, consisting of laying pavements and new sidewalks.

Mr. Cajelan Dufort, architect, of Montreal, has lost an action against Mr. R. Thomas, owner of a moving picture show, owing to the want of a written contract. Mr. Dufort claimed $325 for value of services rendered in connection with the drawing up of plans. Defendant pleaded that Mr. Dufort had offered to draw up the plans on his own initiative. The plans were not used, as the work was given out to a contractor, who had to draw up his own plans and specifications. Mr. Justice Archer held that the contract whereby a person confided to an architect the work of drawing up plans and specifications for building work, or improvements, was a civil contract; and where the amount involved was more than $50, such contract could not be proved except by writing.

Hamilton Builders' Exchange

A meeting of the Board of Directors of the Builders' Exchange of the city of Hamilton was held on March 7th, when a committee was appointed to secure new quarters for the Exchange. The membership of this organization is growing rapidly and the premises now occupied are altogether inadequate to the requirements. At the meeting, twelve new firms became members of the Exchange and Mr. Chas. Hannaford was elected to the Board of Directors.

The regular monthly meeting of the Exchange, held on Tuesday, March 11th, was well attended. The committee appointed to secure new quarters reported progress and received instructions to enter into an agreement for new quarters in Chancery Chambers, on Main street east. This is a central location and will fulfil all the business and social requirements of the Exchange.

Preparations are well under way for the annual banquet of the Exchange, which is to be held at the Royal Hotel on March 28th.

The Clay Products Exposition at Chicago

The second annual Clay Products Exposition was held in the Coliseum, Chicago, February 26 to March 8 inclusive, under the management of the International Brick & Clay Products Exposition Company. During the exhibit the students of the Chicago Art Institute worked from a life model, and a number of clay potters fashioned jugs and vases. Models of brick kilns and numerous photographs showing brick road construction were displayed. Nearly 100 brick companies were represented in the central court.

At the end of the hall a "parcel-post brick bungalow" was erected in less than a week from bricks forwarded by mail from all parts of the country. The prize cottage which was exhibited to indicate what could be erected for $2,000 will be given to the winner of a marble-guessing contest.

Models were exhibited of a cross-section of Chicago's proposed subway, the Trier Center neighborhood, Winnetka, of a farm reclaimed by tile drainage, of brick roads, of silos, corncribs, chimneys, fireproofing, typical building constructions and sectional sewer pipe. Other clay products represented were numerous kinds of fancy, face and common brick built into walls surrounding the booths, terra cotta and roofing tile, sanitary ware, faience, garden ornaments, stoneware insulators, acid tanks, chinaware, lamps, crucibles, terracotta lumber, fire-brick, wall coping and laundry tubs.

In the exhibit of the National Paving Brick Manufacturers' Association were numerous large sepia photographs of brick roads and a few prints showing the construction of hard roads in ancient times.

The United States Bureau of Standards had a display of testing equipment, including a strain gauge used in the measurement of expansion and contraction stresses of street pavement and a demonstration of the method of measuring by optical displacement.

Personal Mention

Mr. F. L. Fellowes, City Engineer of Vancouver

In an issue whose pages are devoted largely to the constructional development of Vancouver, it is appropriate to have special mention of the City Engineer, Mr. F. L. Fellowes. It may be said that Mr. Fellowes is just in "the prime of life," for it is just a half century since he was born at Ottawa. Some of his earliest professional experience was obtained under Mr. C. H. Keefer, of Ottawa; later he was Assistant Engineer at West Toronto in charge of various municipal undertakings; then he had considerable railroad experience—after which he went to the Northwest on survey work. He returned to Toronto, and then, some fifteen years ago, went to Montreal and after three years' private practice was appointed engineer for Westmount. He worked for a year in conjunction with Mr. F. H. Pitcher, engineer of the Montreal Water & Power Company, and Mr. J. C. Macklin, hydraulic engineer, securing data and preparing a report on the best location for the intake of the M. W. & P. Company. He conducted surveys on the River St. Lawrence to determine the velocity and direction of currents and points of shore sewage contamination, with a view to the establishment of a waterworks system for the city of Westmount. Later, he was associated with Mr. Geo. Janin,

Mr. F. L. Fellowes, City Engineer of Vancouver

chief engineer of Montreal, and Mr. Willis Chipman, of Toronto, representing the Federal Government, as a commission to report on the best system of drainage for the west end of the city of Montreal and adjoining municipalities, including the question of the relation of the Little River St. Pierre to the entire new drainage system. He investigated the various systems of lighting, filtration and incineration in use in leading cities in Canada and the United States, and on his report the plants now in operation in Westmount were established. Mr. Fellowes was appointed Chief or Supervising Engineer at Vancouver at the beginning of 1911.

Mr. J. C. Johnston has been appointed engineer of Port Alberni, B.C.

Mr. H. A. Chandler, of Campbellton, has been appointed divisional surveyor for the Atlantic division of the C.N.R. The head office will be in St. John, N.B.

Mr. J. H. Lyons, who was for some time employed at the filtration plant at Toronto Island, has accepted a position with the National Paving Company, Regina.

Mr. G. W. Volckman, vice-president and general manager, MacArthur Perks & Company, Limited, contractors, Ottawa, is at present on a visit to San Francisco, Cal.

Mr. A. A. Kinghorn, B.A.Sc., Roads Branch, Toronto Works Department, has accepted a position as manager of the Asphaltic Concrete Company of Toronto, Limited.

Mr. D. Gilmour has been appointed Superintendent of the Montreal terminals of the Grand Trunk Railway, succeeding Mr. R. W. Scott, relieved on account of ill-health.

Mr. Chas. W. Dill, formerly a member of the firm of Messrs. Dill, Russell & Chambers, Toronto, is now general manager of the National Paving & Contracting Company, Limited, Winnipeg, Man.

Mr. J. W. Turner, former superintendent of waterworks of the city of Strathcona, has, since the amalgamation of Edmonton and Strathcona, been appointed superintendent of waterworks for the amalgamated cities.

At the annual meeting of the Saskatchewan Land Surveyors, held recently at Regina, a paper, "The Selection of Bridge Sites," was given by Mr. A. P. Linton, B.A., B.Sc., assistant chief engineer of the Department of Public Works.

Mr. John Kennedy, consulting engineer to the Montreal Harbour Board, has been confined to his house for about a fortnight with a severe cold. He is now, however, slightly better, and able to return for a short time to the office.

A Calgary architect, Mr. D. S. McIlroy, has been awarded first prize in the competition for plans of the proposed Methodist Church at Prince Albert. The structure will cost approximately $80,000. The construction is to be of red brick with stone trimming.

Mr. Mason H. Baker, city engineer of St. Thomas, Ont., who, as announced in our last issue, has been appointed City Engineer of Prince Albert, will terminate his present engagement on March 31st, and will leave immediately for the West to assume his new duties.

Mr. H. Weller, chief engineer of the Welland Canal, left St. Catharines last week for Panama to study the system of freezing quicksand, which is being successfully worked out on the big canal across the Isthmus. The finding of quicksand on the accepted route for the new Welland has led to this investigation.

Sir John Jackson, the British contractor, has been in Quebec, looking over the plans of the harbour. Sir John, who was accompanied by Mr. G. Hall Scott, of London, England, Messrs. A. Brock, his manager, and J. R. Keller, of Montreal, also visited the Louise docks and the site for the proposed dry dock at St. Joseph de Levis. Sir John will also visit British Columbia, where he is carrying out a big contract.

Mr. H. Victor Brayley, who for some time past has been connected with the Transcontinental Railway at Ottawa, has accepted the position of general manager for Gunn, Richards & Company, New York and Boston, whose business is that of efficiency engineers. Mr. Brayley has opened a temporary office in Ottawa for two or three months before moving the Canadian head office to Montreal. Mr. Brayley has been secretary of the Ottawa branch of the Canadian Society of Civil Engineers for three years.

London's New City Engineer

Mr. W. Norman Ashplant, the newly-appointed city engineer of London, Ont., a sketch of whose career was published in our last issue, will enter upon his duties on April 1. It is of interest to learn that during the period that Mr. Ashplant was engaged in the municipal engineering department of Cape Town he was attached for a time to the staff of Mr. R. O. Wynne-Roberts, M. Inst. C.E., who was then chief of the city hydraulic department, and who is now consulting engineer in charge of the installation of a water system at Regina, and who is also reporting on a large power scheme for the government of Saskatchewan.

Mr. W. Norman Ashplant, London's new City Engineer

Mr. John R. Rablin, M. Am. Soc. C. E., Chief Engineer, Massachusetts Metropolitan Park Commission, Boston, Mass., recently delivered an illustrated lecture on "Metropolitan Park Systems," before the Graduate Students in Highway Engineering at Columbia University.

Mr. V. J. Elmont, B.Sc., A. M. Can. Soc. C. E., read a paper on "Trusses Without Diagonals in Reinforced Concrete" before the members of the society at their last monthly meeting. There was a very large attendance of members, and at the close of the paper a discussion took place, Mr. J. A. Jamieson, Prof. Mackay of McGill, and Mr. Mayer, Engineer of the Board of Commissioners for the new Quebec bridge, were among the speakers. We propose to publish a summary of Mr. Elmont's paper in our next issue.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Essex, Ont.
Street paving, cost $5,500, contemplated by the town council. Clerk, Geo. E. Wightman. Ten feet wide. Material to be selected shortly and tenders called.

Halifax, N.S.
Tenders will be received addressed to Mayor, by Committee of Works until April 2nd. For construction of a reinforced concrete reservoir and gate house. Plans at office of City Engineer, F. W. W. Doane. Clerk of Works, J. J. Hopewell.

North Vancouver, B.C.
Road improvements planned by City Council. District engineer, Cosgrave. For contract No. C, local improvements of (a) Lynn Valley road, Section No. 2; (b) Peters road; (c) Dovercourt road; (d) Carisbrooke road. Comprising clearing approximately 53 acres, grading, 28,500 cu. yds.; cedar culverts and bulkheading, 310,000 F.O.M.; macadamizing, 20,600 sq. yds.; gravelling, 1,840 sq. yds., and contingent work. Specifications at office of Engineer, who will receive individual tenders until March 20th.

Windsor, Ont.
Tenders addressed to Chairman Water Commissioners, J. F. Smith, will be received until March 25th, for 400 tons more or less of cast iron water pipe, size from 6-in. to 12-in., also specials, consisting of crosses, tees and bends. W. A. Hanrahan, Room 3 City Hall.

Winnipeg, Man.
Sewers planned for Rural Municipality of St. Vital, in St. Marys Road, St. Vital Road, Magee Drive and from St. Marys Road to River. Tenders were not considered on account of tightness of money market. Work will not likely start till 1914 unless money becomes easier. Reeve, R. Wilson, Grandvital P. O., Man. Engineer, L. G. Mullon, 372 St. Jean Baptiste street, St. Boniface, Man.

CONTRACTS AWARDED

South Vancouver, B.C.
Paving, Westminster road. General contractors, The Columbia Bitulithic Paving Co., 433 Granville street, at $235,169.02, and The B.C. Granitoid Co., 142 Hastings street west, for paving between tracks, at $25,431.25. Contracts which were awarded last year were cancelled. Clerk, W. McQueen.

Railroads, Bridges and Wharves

British Columbia
Tenders received until April 15th for driving a double track tunnel through Rogers' Pass, length approximately, 28,000 feet, for C. P. R. Further information from Chief Engineer, Winnipeg, or Engineer of Grade Revision, Kamloops. Chief engineer, J. G. Sullivan, Winnipeg, Man. Engineer Grade Revision, F. F. Busteed, Kamloops, B.C.

Chatham, Ont.
Tenders received by City Clerk, W. G. Merritt, until March 24th, for 20 foot span steel highway bridge. Engineer, F. P. Adams.

Inwood, Man.
C. N. Rly. Co.'s location of third class station at Inwood has been approved.

London, Ont.
Bridge, cost $25,000, Wharncliffe road. Mayor, C. M. R. Graham. Engineer, W. H. Brazier. Tenders received by Chairman Board of Works, B. W. Bennett, until April 10th, for (a) construction of concrete piers and butments; (b) erection of 3 130 foot span riveted steel trusses; (c) construction of reinforced concrete floor. Plans, specifications, etc., at office of Engineer.

Maniwaki Reserve, Que., Co. of Wright
Tenders received by W. J. McCaffrey, Indian Agent, Maniwaki, until April 5th, for construction of concrete abutments for bridge over Conger Creek. Plans, etc., at office of Indian Agent, and at Dept., Ottawa. Dom. Govt. Dept. of Indian Affairs. Secretary, J. D. McLean, Ottawa.

Newton, Ont.
Station, cost $6,000, for C. P. R., Head office, Montreal. Engineer, Tapley, London. Two storeys, white brick construction. Plans in progress.

Dist. North Alberta
The G. T. P. Rly Co. has been authorized to construct spur for the Edmonton Gravel Co., Ltd., in Secs. 16 and 21, Twp. 53 R. 23 W. 4 m.

Port Arthur, Ont.
Railway material required by city council. Tenders received by Commissioner of Utilities, J. J. Hackney. Engineer, L. M. Jones, until March 31st for (a) No. 2/0 round trolley wire, 8 tons; No 4/0 flexible feeder, wire D B.W.P. 6 bolts; (c) steel intersections, frogs, switches, etc. Specifications, etc., at office of City Engineer.

Redcliffe, Alta.
Canadian Pacific Railway Company has been authorized to construct spur for the Redcliffe Pressed Brick Company at Redcliffe, Alta.

Toronto, Ont.
Tenders will be received by Mayor, H. C. Hocken, until April 1st for concrete piers, abutments and floor for St. Clair avenue bridge (east of Bathurst street). Specifications at Dept. of Railways and Bridges, City Hall. R. C. Harris, Commissioner of Works.

Wasing, Ont.
C. N. O. Rly. Co.'s location of station at Wasing Twp. Chisholm, Dist. Nipissing, Ont., at mileage 204.9 from Ottawa, has been approved.

CONTRACTS AWARDED

Feltzen South, N.S.
Breakwater, cost $13,800. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractor, Duncan L. Fraser, Bridgewater, N.S.

Ottawa, Ont.
Bridge, Bank street. Mayor, J. A. Ellis. Acting City Engineer, F. C. Askwith, City Hall. General contractors, Jones & Girourd, Central Chambers, Elgin street. Two arches to be finished, rails to be laid across, creosoted wooden blocks and ornamental iron standards to be let, reinforced concrete construction.

St. Anselme, Que.
Steel bridges, cost $16,000, "Etchemin River." Secretary, L. V. Bernier. General contractors, Sherbrooke Iron Works, Ltd., Sherbrooke. One bridge 210 ft. and the other 225 ft.

Public Building, Churches, Schools, etc.

Aldboro Twp., Ont.
School, cost $5,200. Chairman, J. D. Campbell, Crenan, P.Q. Builder, A. McKillop & Sons, West Lorne. Tenders received by Secretary until March 20th. Cement foundation, brick veneer construction.

Athens, Ont.
Public building, cost $12,000, contemplated by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. The above amount has been included in estimates.

Aurora, Ont.
Public Building, cost $20,000, planned by Dominion Government, Department of Public Works. Secretary, R. C. Desrochers, Ottawa. The above amount has been included in estimates.

Berlin, Ont.
Public building, cost $40,000, contemplated by Dominion Government, Department of Public Works. Secretary, R. C. Desrochers, Ottawa. The above amount has been included in estimates.

Beechwood, Ont.
Church, cost $8,000, for Presbyterian Congregation. Chairman Building Committee, D. G. Moore, Fernhill P.O. Architect, H. Owen, Strathroy. One storey and basement, 42 x 50, white brick

construction, stone and cement foundation. Plans drawn.

Bracebridge, Ont.
Public building planned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Brantford, Ont.
Alterations and additions, cost $6,000, planned for Brant avenue Methodist Church. Chairman of Committee, T. Harry Jones. Architect, L. D. Barber. Tenders will probably be called about April 1st.

Brockville, Ont.
Hospital planned by Dept. of Public Works. Secretary, H. F. McNaughton, Parliament Buildings, Toronto. Tenders received for all trades except heating, plumbing and wiring.

Drummondville, Que.
Convent for Rev. Soeurs de la Presentation de Marie. Architect, Frs. Gauthier. Plans drawn.

East London, Ont.
Addition to school, cost $10,000, planned by Board of Education. Chairman, John M. Gunn. Architect, A. E. Nutter, Dominion Bank Building. Two storeys, white brick construction, stone and cement foundation.

Edmonton, Alta.
Tenders received by Public School Board until March 20th, 1913, for erecting a 16-room brick school on Block Seven, Hudson Bay Reserve. Plans, specifications, etc., at office of the Board.

Esquimalt, B.C.
The Board of Education plan building addition of 2 wings to school, to seat 450, an assembly room to seat 800, and a school room over the assembly room. Plans were selected in competition. Secretary, A. Mulcahey. Architect, W. Ridgeway Wilson, 323 Pemberton Blk., Victoria, B.C.

Ft. Frances, Ont.
Court House contemplated by Prov. Govt. Dept. of Public Works. Clerk, J. W. Walker. Town have asked province for $50,000.

Armory, cost $40,000, contemplated by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Clerk, J. W. Walker. Plans will be prepared.

Hamilton, Ont.
Church, cost $15,000, for Kensington avenue Methodists. Pastor, Rev. M. E. Conron, 158 Avondale avenue. Architect, F. W. Warren, 415 King William street. One storey, cement foundation, pressed brick construction. Plans drawn.

London, Ont.
The hospital trust contemplates installing a new steam heating plant in connection with incinerator and hospital plant. Cost $[illegible]. Chairman, Col. Wm. Gartshore.

Medicine Hat, Alta.
The School Board has purchased Black 10, Powell, and will erect school building in the near future.

Montreal, Que.
School. Tenders received by Secretary-treasurer, Chas. [illegible], [illegible] Rosemont Blvd., until March 22nd. Heating and ventilating. Plans and specifications at office of Viau & Venne, architects, 76 St. Gabriel street.

College planned by town council of Verdun. Architect, J. E. A. Benoit, 1198 Wellington street, Verdun. Tenders received by Sec.-Treas., V. Deguise, 137 Church street, Verdun, until March 26th.

Armory, Esplanade. Architects, MacVicar & Heriot, 104 Union avenue. Tenders will be received by Secretary, R. C. Desrochers, Ottawa, Dom. Govt. Dept. of Public Works, until April 1st. Two storeys, 126 x 169, stone and red pressed brick construction, cement foundation.

New Germany, N.S.
Church, cost $2,500, for Methodist Congregation. Chairman of Committee, I. B. DeLong. Architect, L. S. DeLong, is preparing plans. Two storeys, 50 x 35, wood construction, concrete foundation.

Ottawa, Ont.
Addition to Isolation Hospital contemplated by the Board of Health. Mayor, J. E. Ellis. Plans will be prepared.

Dr. Robertson and Dr. Parent, of Board of Health, will receive prices, etc., on equipment and apparatus. Dr. Sheriff, Medical Health Officer.

School house will be rebuilt for Nepean S. S. No. 9. Tenders received by Chairman, Daniel Moloughney, Manotick, P. O., until March 29th. Plans and specifications at house of Michael Hawley, Manotick.

Point Grey, B.C.
School, cost $60,000, will be erected. Plans of Architect, Claude P. Jones, 429 Pender street west, Vancouver, were selected in competition.

Scotstown, Que.
Oddfellows hall planned. Scotstown Valley Lodge, No. 25, I.O.O.F., Scotstown, Que., are looking for a suitable site.

Toronto, Ont.
School planned for School Section No. 12, Danforth Road. Tenders received by architects, Lindsay & Brydon, 147 Victoria street, until April 7th, for all trades.

Barracks planned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Wallaceburg, Ont.
School, cost $9,000, for R.C. Church Separate School Board. Architect, R. W. Fawcett, 152 Essex street, Sarnia. Two storeys, red brick construction, brick foundation. Plans prepared.

Winnipeg, Man.
The Board of Control plan addition and alterations to public lavatories on Market avenue. Plans, specifications, etc., at office of Engineer. Tenders received by Secretary, M. Peterson, until March [illegible]. Engineer, H. N. Ruttan, [illegible].

School, cost $[illegible], Clifton. Architect, J. B. Mitchell, Commissioner of School Buildings, William and Ellen Sts. Two storeys and basement, [illegible], stone foundation, structural steel, Tyndal stone and concrete [illegible] construction. Plans, specifications, etc., at office of architect, who will receive tenders till April 3.

CONTRACTS AWARDED

Dauphin, Man.
Church, cost $15,600, for Anglican Congregation. Architect, Mr. Bossom. General contractors, H. L. Hanks, 224 6th avenue southwest.

Dundas, Ont.
Sunday school, cost $6,000, for St. James Anglican Church. Architect, A. W. Peene, Hamilton. General contractor, Thos. E. Wood. Two storeys, 60 x 120, artificial stone construction, cement foundation.

Edmonton, Alta.
College building, cost $40,000, for Jesuit College, 1976 28th street. Architect and general contractor, Arthur Mercier, 1824 Kinistino street. Three storeys, 100 x 50, cement foundation, brick construction. Excavation done.

Convent, cost $20,000, for F. C. Sisters, 10th and McKay streets. Architect and general contractor, E. Sabourin, 110 13th street. Four storeys, 30 x 50, brick foundation, brick construction.

Morden, Man.
Public building, cost $34,000. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. General contractors, Brown Construction Co., Ltd., 10 Monadnock Building, Winnipeg, Man.

Stadacona, Que.
Hospital, Charlesburg road, for Theo. Leclerc, in trust, Real Estate Agent, Quebec, Que. Masons, Jos. Villeneuve & Fils, 277 Prince Edward, Que. Carpenters, Cote & Frere, 7th and 2nd Ave. Limoilou. Roofing, Ulric Gauvin, Limoilou. Painting, Simard & Frere, 270 St. Joseph, Que. Plumbing, O. Picard & Fils, 199 St. John street, Que. Stone, Jos. Asselin, 410 St. Paul street, Que.

Business Buildings and Industrial Plants

Brandon, Man.
Warehouse contemplated for Gordon McKay & Co., Ltd., Bay and Front Sts., Toronto. The city will give free site on corner of Pacific avenue and Sixth St. Plans will be prepared.

East London, Ont.
[illegible] store, cost $[illegible], contemplated for W. Mullins, Wilson avenue and Dundas street. Architect to be selected. Two storeys, 35 x 55, stone and cement foundation, white brick construction.

Store, cost $8,000, Dundas street, contemplated by Reginald Christian, c/o East London Progressive Association Offices. Architect to be selected. Two storeys, stone and cement foundation, brick construction.

[illegible] Architect, their own draughtsman. [illegible] cement foundation, brick construction. Plans in progress.

East Sherbrooke, Que.
[illegible] planned for Henri Desruisseau, 1 Bridge street. Architect, J. W. Gregoire, Sherbrooke. Three

storeys, 40 x 80, and 60 x 30 x 26 brick construction.

Fort William, Ont.

Store, cost $15,000, for Finnish Co-Operative Co., Simpson street. Two stys., [illegible]. Plans in progress.

Addition to office, cost $8,000, Union Depot, for Can. Pac. Rly. Co. One sty., 100 x 30, brick construction. Plans in progress.

[illegible] department store, cost $25,000, James street north, for Stanley Mills & Co., 11 King street east. Architects, Mills & Hutton, Room 804, Bank of Hamilton Building. Five storeys, 24 x 140, hollow tile construction. Plans in progress.

Factory, cost $40,000, Sherman Ave., for International Harvester Co. General manager, H. H. Biggert. Plans in progress.

Hebron, N.S.

Addition to shoe factory planned for The H. H. Crosby Co. Will require [illegible] machinery.

Montreal, Que.

Three stores, cost $23,000, St. Catherine and McGill streets, for Mr. B. Tannenbaum, 226 Fairmont avenue west. Two storeys, 60 x 80, structural steel and reinforced concrete construction, stone foundation. Plans will be prepared.

Ottawa, Ont.

Business building, cost $90,000, Albert street, for S. McClennagen, A. G. Acres, Frank Jarman, all of Bank street. Five storeys, fireproof construction. Plans in progress.

Lumber mill and office, cost $50,000. McAuliffe Davis Lumber Co., Duke St., will commence at once to rebuild, cement foundation, reinforced construction.

Prince Albert, Sask.

Addition to store, cost $10,000, for Hudson Bay Company. Architect, O. Abrechtsen, Agnes Bldg., is preparing plans. Stone and brick construction.

Sherbrooke, Que.

Offices, cost $15,000, alterations, 95 Wellington street, for J. W. Gregoire, Five storeys, brick, cement and fireproof construction, stone foundation. Plans in progress.

Saskatoon, Sask.

Meat packing plant planned for The Armour Co., Chicago, Ill. Site has been purchased.

South Edmonton, Alta.

Iron works contemplated by Dickson Bridge Works, South Edmonton. Two storeys, to cover one acre. Will manufacture steel girders, etc.

Swift Current, Sask.

The International Harvester Co., Chicago, Ill., here will erect large distributing warehouse.

Toronto, Ont.

Stores for S. F. Wilson Co., 73 Adelaide street west. Architects, Symons & Rae, 15 Toronto street, are preparing plans. Stone and brick construction, felt and gravel roofing.

Four attached stores, cost $8,000, Greenwood, for W. J. Grant, 20 Cheltenham avenue. Architect, T. Harris, 43 Howard Park avenue. Two storeys, 42 x 60, stone foundation, brick construction. Plans drawn.

Addition to warehouse, cost $5,000, for Heintzman & Co., 193 Yonge street. Architect, J. Wilson Grey, Confed. Life Building. One storey, 30 x 32, brick foundation, structural steel and brick construction. Plans drawn.

Factory, contemplated for W. E. Dillon Co., Ltd., 78 Richmond east. Site purchased 50 x 175, and plans will be prepared.

Torbrook, N.S.

Hoisting and crushing plant for Canada Iron Corporation Co., Ltd., Mark Fisher Building, Montreal. Engineer, W. F. C. Parsons, Montreal. Arthur Neil, Purchasing Agency Dept. of Co., Montreal, has a list of requirements for new plant in Torbrook. Pulleys, rubber belting, electric motors, etc.

Vancouver, B.C.

Warehouse, Beattie street, for National Drug & Chemical Co., 125 Pender street west. Architect, H. S. Griffith, 708 Dominion Trust Building. Four storey and double basement, 120 x 120, reinforced concrete construction, two freight elevators. Tenders called.

Victoria, B.C.

Addition to hotel, cost $100,000, planned. Owner, Stephen Jones, proprietor Dominion Hotel. Architect, P. Fox. Wing 5 storeys, 40 ft. frontage, 50 rooms, brick construction. Tenders will be called.

Winnipeg, Man.

Office and warehouse contemplated for D. Ackland & Sons, 73 Higgins Ave. Architect, Frank R. Evans, 506 Somerset Bldg., has prepared plans. Four stys. and basement 66 x 70, solid brick and stone construction, to be erected on present office site. Construction will depend entirely on the state of the financial market. Nothing will be done in the meantime.

The Acme Sash & Door Co., 304-320 Rue Des Meurons, St. Boniface, Man., will build large sash and door warehouse in the spring and also equip their yards with a complete system of trackage, using tracks and light rails, also an exhaust fan system in the factory, and a new dry kiln. The manager, W. J. Wilson, will draw plans and company will do work by day labor.

CONTRACTS AWARDED

Brantford, Ont.

Workshop and factory building, cost $8,000, for Turnbull & Cutcliffe, Ltd., King and Colborne streets. Builder Nathan Kew, 97 Erie avenue. Roofing, heating and iron work will be done by Owners. Two storeys, 50 x 80, cement foundation, Milton pressed brick.

Dauphin, Man.

Stores, cost $20,000, for McDonald & Voigt. Architect, H. Bossom. General contractor, Mr. F. Neely. Two storeys, 92 x 44.

Edmonton, Alta.

Stores and apartments, cost $30,000, for Jno. Hagmann, Edmonton, Alta. Architect and general contractor, T. C. Pennie, 161 Cliff street. Three storeys, 93 x 40, brick and structural steel construction.

Office building, cost $40,000, for Miller, Cannel & Spencer, Jasper avenue. Architect, David Hardie. General contractors, Cannel, Spencer, Austin & Co. Four storeys, 53 x 47, brick and structural steel construction, cement foundation.

Galt, Ont.

Addition to shoe factory, cost $35,000, for Galt Shoe Mfg. Co. Architect, Wm. Scott, Chapman street. General contractor, P. H. Secord & Sons, Brantford. 4 storeys, stone and cement foundation, brick construction.

Hamilton, Ont.

Stores and apartments, cost $7,000, Barton street east, for Charles Lemon, 156 Markland street. Architect, E. B. Patterson, 167½ King street north. General contractor, W. H. Leedham, 81 George street. Two storeys, 37 x 35, pressed brick construction, cement foundation. General contractor will sub-let some of the contracts. Work to commence shortly.

Montreal, Que.

Store, cost $5,000, for Geo. Gates, 481 St. Catherine street. Architects, Hogle & Davis, 80 St. Francois Xavier. General contractor, J. L. David, 75 St Antoine. Cement foundation, cut stone and brick construction.

Ottawa, Ont.

Addition to factory, cost $3,500, for J. R. Cameron, 321 Bank street. General contractor, D. J. Spencer, 103 4th avenue. Cement foundation, solid brick construction.

Regina, Sask.

Departmental store, cost $450,000, Albert, for Mr. Sherwood. Architects, Brown & Vallance, 1006 McArthur Bldg., Winnipeg. General contractor, R. J. Lecky. Five storeys, 162 x 100, reinforced concrete construction, brick foundation, felt and gravel.

Toronto, Ont.

Store and residence, cost $4,000, for R. F. Briston, 2466 St. Clair avenue. Architect and builder, T. M. Day, Windermere avenue. Two storeys, brick construction.

Store and residence, cost $3,000, Arlington. Owner and builder, A. J. Bottrell, 512 Palmerston. Two storeys, 20 x 36, brick foundation and construction.

Garage, cost $4,000, Queen and Beach. Owner and builder, A. B. Webster, 55 Spruce Hill road. Two storeys, 23 x 64, brick foundation, structural steel and brick construction.

Vancouver, B.C.

Office and telephone exchange building, cost $350,000, for The B.C. Telephone Co., 555 Seymour street. Ten storeys, 50 x 120. Contract for steel let to J. Coughlan & Sons, 149 Hastings street west.

Stable, cost $20,000, Smythe and Beatty streets, for The Imperial Oil Co., 404 Abbott street. General contractor, S. J. Steeves, 842 Hamilton street. Three storeys, 110 x 40, brick and reinforced concrete construction.

Office building, cost $600,000, Richard and Hastings streets, for J. W. Weart, 837 Hastings street west. Architects, Russell, Babcock & Rice, 837 Hastings street west. General contractors, The Canadian Ferro Concrete Co., 951 Cordova east. Elevators, The Canadian Van Emon Elevator Co., 207 Hastings street west. Fifteen storeys, structural steel construction, pressed brick and terra cotta faced.

Store and apartment building, cost $132,000, for C. N. Davidson, 779 Burrard street. Architects, Braunton & Leibert, 142 Hastings street west. General contractor, W. W. Jarrett, 790 Granville street. Six storeys, 55 x 120, brick and mill construction, pressed brick faced, trimmed with stone, laundry equipment required, telephones, 2 elevators, garbage chutes from each suite, refuse consumer in basement. General contractor will receive tenders for brick work, plastering, concrete and electric work, painting and iron work.

Warehouse and office building, cost $100,000, Yukon and Front streets, for The B.C. Telephone Co., 555 Seymour street. Excavation contractors, Brooks & Weisdepp, 310 Lansdowne avenue. Six storeys, 46 x 109, reinforced concrete construction.

Welland, Ont.

Four stores and residences, cost $12,000, Muir street. Architect and builder, Benjamin Hewson. Work to be done by day labor. Two storeys, 80 x 60, cement foundation, brick construction

Winnipeg, Man.

Restaurant, cost $38,000, for H. E. R. Rodgers, 262 Portage avenue. General contractor and architect, G. S. Wyman, McGreevy Building. Three storeys and basement, 54 x 120, reinforced brick construction, brick foundation. Excavating started.

Winnipeg, Man.

Publishing plant for Tribune Publishing Co., 211 McDermot avenue. Architect, J. D. Atchison, Trust & Loan Bldg., Portage E. General contractors, Hazelton & Walin, Donalda Building. Roofing, painting, heating, plumbing, electric and interior fittings not let yet. Three storeys, 75 x 120, concrete foundation, reinforced concrete construction.

Residences

Brockville, Ont.

Two residences, cost $8,000, Perth St., for Albert Henderson. Tenders close with Architect, A. S. Allaster, March 22. Two storeys, 40 x 35, brick construction.

Dundas, Ont.

Residences, cost $10,000, MacNab St., for Thos. E. Wood. Architect to be chosen. Two storeys, white brick construction, stone and cement foundation. Plans will be prepared.

Hamilton, Ont.

Residence, cost $6,000, for J. Lewis, Dundas road. Architects, Rastrick & Sons, 30 King street east. Two storeys, 40 x 40, brick and stone construction, stone foundation. Plans in progress.

Montreal, Que.

Three bungalows, cost $9,000, for Finnie Millar Co., 815-817 New Birks Building, Montreal. Tenders will be received by Architect, G. A. Nosworthy, 814 New Birks Building, Montreal, from April 1st to 10th. One storey, 42 x 32, each, cement foundation, frame construction.

Residence, cost $8,000, for Col. H. Dixon & Button [illegible], St. James street, Montreal. Tenders will be received by Architect, G. A. Nosworthy, 814 New Birks Building, Montreal, from April 1st to 10th. Two stys., 25 x 50, concrete foundation, pressed brick and terra cotta construction.

Five flats, cost $5,000, La Casse, for A. Campbell, Jr., 190 Selby avenue, brick construction, cement foundation. Plans drawn.

Ottawa, Ont.

Residence, cost $9,000, Clemow, for Mr. Allen, c/o Allen & Cochrane, 37 Sparks street. Architect, W. Herbert George, Castle Bldg., Queen street. Stone foundation, pressed brick construction. Plans drawn.

Residence, cost $10,000, Clemow Ave., contemplated for Jno. Foley, Central Chambers. Architect not chosen. 2½-storeys, brick, stone foundation.

Residence, cost $6,000, Driveway, for W. H. Walker, 482 Cooper street. Tenders received by Architect, W. Herbert George, Castle Building, Queen street, after March 14th. 2½-storeys, solid brick construction, stone foundation.

Port Colborne, Ont.

Residence, cost $5,000, for F. Fawcett. Tenders received by Architect, A. E. Nicholson, St. Catharines, until April 1st. Two storeys, 28 x 42, brick construction, concrete foundation.

Red Deer, Alta.

Residence, cost $6,000, for G. Hugh Murrin. Two storeys, 37 x 36, brick, cement foundation. Plans in progress.

St. John, N.B.

Four residences, cost $20,000, Douglas avenue, for St. John Realty Co., c/o L. P. D. Tilley, Prince William street. Architect, F. Neil Brodie, 42 Princess street. Two storeys, concrete foundation, frame construction. Plans in progress.

Apartment house, Clarendon, for Mrs. J. Gallagher, 284 Main street. Architect, Garnet Wilson, 52 Princess street. Two storeys, 34 x 50, concrete foundation, frame construction. Plans in progress.

Sherbrooke, Que.

Residence, cost $8,000, Dufferin ave., for Bruce Fletcher. Architect, J. G. Brown. 2½ storeys, white brick construction, electric lighting, patent roofing. Work to be done by day labor. Plans drawn.

Toronto, Ont.

Apartment, cost $8,000, for F. Floyd, 104 Hazelton ave. Three storeys, 20 x 66, brick foundation, brick and structural steel construction. Plans ready.

Addition to residence, cost $4,000, for F. H. George, 74 Avenue road. Architect, J. H. Harvey, 164 Bay street. Two storeys, 18 x 36, brick construction, stone and brick foundation. Plans drawn.

Apartments, cost $10,000, Euclid and Barton, for Mr. Bradey, 236 Yonge St. Architect, A. J. Rattray, 123 Bay street. Three storeys, [illegible], brick foundation, structural steel and brick construction.

Two detached residences, [illegible] avenue, for Phillip & Cooper, 36 and 38 Essex. Architect, G. Miller, [illegible] road. Two storeys, [illegible] x 42, stone foundation, brick construction. Plans drawn.

Two detached residences, cost [illegible], Belsize avenue, for A Norman, 10 Olive avenue. Architect, Victor L. Gladman, [illegible] Confederation Life Building. [illegible] storeys, 23 x 34, brick construction and foundation. Plans drawn.

Two detached residences, cost $7,000, for R. A. Shields, 121 Hilton. Architect, A. Rollo, 12 Queen east. Two stys., 22 x 36, brick foundation and construction. Plans drawn.

Residence, cost $6,500, Austin Terrace, for M. L. Kent, 362 Walmer road. Architect, Designing & Draughting, 36 Toronto street. Two storeys, brick foundation and construction. Plans drawn.

Residence, cost $6,000, Madison, for W. F. McLean, Madison and Dupont St. Architect, A. J. Rattray, Stair Building. Two storeys, 25 x 32, brick construction, stone foundation. Plans drawn.

Residence, cost $3,500, Baker, for I. C. Feel, 137 Church street. Architect, W. H. Ratcliffe, 2188 Gerrard east. 2½-storeys, 22 x 37, brick construction, stone foundation. Plans drawn.

Residence, cost $3,000, for Moore Bros., 10 Kenwood avenue. Architect, P. H. Finney, 79 Adelaide east. Two storeys, 19 x 58, brick construction and foundation. Plans drawn.

One pair residences, cost $6,800, for Jas. Angus, 261 Spadina road. 2½-stys., 28 x 42, stone foundation, brick construction. Plans drawn.

Walkerville, Ont.

Eight family terrace, cost $15,000, Victoria Rd., for Chas. Chilver. Architects, Smith & Walker, Excise Bldg. Two storeys, brick and structural steel construction, cement foundation. Plans in progress.

Wallaceburg, Ont.

Manse, cost $4,000, for Presbyterian Church Congregation. Architect, R. W. Fawcett, 152 Essex street, Sarnia. Pastor, Rev. M. C. Tait. Two storeys, brick construction. Plans in progress.

Winnipeg, Man.

Apartment Block, cost $20,000, Transcona, for Canadian Pub. Service Corp., Somerset Bldg. Tenders will be called about April 11. Two storeys, 18 suites, concrete foundation, frame and brick veneer construction.

CONTRACTS AWARDED

Caledonia, Ont.

Residence, cost $3,500, for Thomas Draper. Builder and general contractor, J. H. Burgess. Two storey, cement construction and foundation.

Dundas, Ont.

Residence, cost $3,500, for Wm. Lunn, King street west. Architect, A. K. Gilmour. Mason, F. W. Church. Carpenter and roofing, A. K. Gilmour. Painting, George Amsden. Heating, plumbing and electric, Bernhardt & Gies. Two storeys, 28 x 30, stone foundation.

Edmonton, Alta.

Residence, cost $4,000. Architect and general contractor, R. R. Rodgers, 2422 [illegible] ave. Two storeys, [illegible], brick foundation, frame construction. Excavating started.

Residence, cost $4,000, Jasper, for P. E. Mc-Lary. Arch. and general contractors, Mullart & Wright. Two storeys, [illegible], frame construction, brick foundation.

London, Ont.

Residence, cost $7,000, Wellington St. Owner and builder, Israel Taylor, St. George Apartments. Two storeys, [illegible]

(Continued on page 81)

Tenders and For Sale Department

Town of Swift Current, Sask.

Tenders for Electrical Machinery

Sealed tenders, endorsed "Tenders for Electrical Machinery," and addressed to the Secretary-Treasurer, Swift Current, Sask., will be received up to noon of the **31st of March, 1913**, for [illegible] kw. and one four hundred kw. alternating current generators, direct connected to high speed vertical engines or horizontal turbines, complete with all accessories.

Copies of specifications may be obtained from the undersigned.

A marked cheque for five per cent. of the amount of the tender must accompany each bid.

The lowest or any tender not necessarily [illegible]

GEO. D. MacKIE, Town Engineer.

[illegible]

CITY OF SASKATOON

Tenders for Pavements

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Pavement," will be received up to twelve o'clock noon on Friday, **March 28th, 1913**, for the construction of approximately 42,000 square yards of pavement, and 12,800 lineal feet of Concrete Gutter.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask., February 21st, 1913.
9-10-11-12

Tenders for Supplies

Sealed tenders, registered and clearly marked on the outside of envelope, "Tenders for Electrical Department Supplies," and addressed to the City Commissioners, Regina, Saskatchewan, will be received up until noon of **March 29th, 1913**, for the supply of:—

Section No. 1.—Weatherproof copper wire.
Section No. 2.—Western cedar poles.
Section No. 3.—Cross-arms.
Section No. 4.—Top-pins, insulators, etc.
Section No. 5.—Pole line hardware.
Section No. 6.—Pole type transformers.
Section No. 7.—Integrating watt meters, single, polyphase and two rate.

Section No. 8.—Metal flame arc lamps and sta-[illegible]

Section No. 9.—Series cut-out mast arms for arc lights.

Section No. 10.—Underground material.
Section No. 11.—Fire alarm boxes and gongs.
Price to be F.O.B. Regina.

Copies of specifications may be had from E. W. Bull, Superintendent of Light and Power, Re-[illegible]

A marked cheque covering 5 p.c. (five per cent.) of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
9-10-11-12-13 Supt. of Light & Power.

CITY OF SASKATOON

Tenders for Labor on Storm Sewers

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Labor on Storm Sewers," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the laying of approximately 6,525 lineal feet of Storm Sewer; 2,100 lineal feet of Catch Basin Connections, and the construction of Manholes, Catchbasins and Appurtenances.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

Tenders for Power House Equipment

Sealed tenders, registered and clearly marked on the outside of the envelope "Tender for Power House Equipment," and addressed to the City Commissioners at Regina, Sask., will be received up until noon of **April 30th** for the supply of:—

1 1200 kw. synchronous motor generator or motor converter set, complete with panel for the control of A.C. motor and generator panel, and equalizing pedestal for the control of D.C. generator.

Specifications may be had upon application to Mr. E. W. Bull, Superintendent of Light and Power, Regina, Sask.

A marked cheque for five (5 p.c.) per cent. of the amount of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
11-15 Superintendent of Light and Power.

CITY OF SASKATOON

Tenders for Concrete Sidewalks

Sealed tenders, addressed to the City Commissioners, and endorsed "Tender for Concrete Sidewalks," will be received up to twelve o'clock noon on **Friday, March 28th, 1913**, for the construction of approximately:—

265,390 square feet of Concrete Walk.
5,700 square feet of Lane Crossings.
28,760 lineal feet of Separate Curb.
22,050 lineal feet of Combined Curb.

The Corporation reserves the right to divide the work into two contracts, and to reject any or all tenders.

All information may be obtained on application to George T. Clark, City Engineer, Saskatoon, Sask.

F. E. HARRISON, Mayor,
Chairman of Commissioners.

Saskatoon, Sask.,
February 21st, 1913. 9-10-11-12

CITY OF CHATHAM

Tenders for Steel Bridge

Sealed tenders addressed to W. G. Merritt, City Clerk, and marked "Tenders for Steel Bridge," will be received until 5 o'clock p.m., **Monday, March 24th, 1913**, for a steel highway bridge of 90-foot span.

Plans and specifications may be seen and forms of tender obtained at the office of the City Engineer, Chatham, Ont.

F. P. ADAMS,
City Engineer.
Chatham, Ont., Mar. 10, 1913. 12-13

City of Moose Jaw, Sask.

TENDERS FOR

Boiler Room Equipment

Sealed tenders, marked "Tenders for Boiler Room Equipment," addressed to the City Commissioners, Moose Jaw, Sask., will be received up till 12 o'clock noon on **Wednesday, March 26th, 1913**, for the following:—

One fuel economizer with 7,000 sq. ft. heating surface.

One induced draft plant to handle 120,000 cu. ft. of gases per minute.

Each tender must be accompanied by a marked cheque or cash deposit equal to at least five per cent. of the amount of tender.

Plans and specifications may be obtained upon application to J. D. Peters, Electrical Superintendent, Moose Jaw, Sask.

The lowest or any tender not necessarily accepted.

JAMES PASCOE,
L. W. RUNDLETT,
W. F. HEAL, City Commissioners.
Moose Jaw, Feb. 25, 1913. 10-12

HALIFAX, N. S.

Water Works

Sealed tenders addressed to the Mayor for the construction of a Reinforced Concrete Reservoir and Gate House will be received at the office of the Committee on Works of the City of Halifax, N.S., until noon on **Wednesday, April 2, 1913.**

Each tender must be accompanied by a properly certified cheque for the sum of one thousand dollars, payable to the order of the City Treasurer of the City of Halifax, said cheque to be returned to the bidder unless he fails to execute the contract should it be awarded to him, within ten days of such award.

A bond in the sum of ten thousand dollars with two approved sureties or with an approved Surety Company as surety, will be required for the faithful performance of the contract.

Notice to contractors, form of tender, contract, specifications and bond can be obtained, and plans can be seen at the office of the City Engineer.

The City reserves the right to reject any or all tenders should it deem it advisable to do so, and reserves the right to award the contract as it deems best.

By order,

J. J. HOPEWELL,
10-12 Clerk of Works

Town of Swift Current, Sask.

Tenders for Electrical Machinery

The time for receiving tenders in connection with the above has been extended from Monday, March 31st, till noon of Monday, April 14th.

GEO. D. MACKIE,
12-13 Town Engineer.

Tenders Wanted

Tenders will be received by the undersigned up till noon on **Tuesday, March 25th, 1913**, for:—

One Generator for Incandescent Lighting for a 260 horse power engine. Tenders to furnish all information as to construction, dimensions, service and guarantee, and price to include free delivery at the Light Plant of the City.

100 to 125 ornamental cast iron poles, 13 ft. 6 in. high, 5-light cluster (1 upright and 4 pendant) 6-in. standard globe holders; suitable for underground wiring system. Price F. O. B. Windsor.

Tenders for Generator and Poles to be made separately. No tender in either case necessarily accepted.

STEPHEN LUSTED, Clerk.
Windsor, Ont., March 6, 1913. 11-12

Department of Railways and Canals

Car Ferry Terminal

CARLETON POINT

Prince Edward Island

Sealed tenders addressed to the undersigned and marked "Tender for Car Ferry Terminal, Carleton Point," will be received at this office until 16 o'clock on **Tuesday, March 25th, 1913**.

Plans, specifications and form of contract to be entered into can be seen on or after February 20th, at the Office of the Chief Engineer of the Department of Railways and Canals, Ottawa, at the office of the Chief Engineer of the Intercolonial Railway at Moncton, N.B., and at the office of Horace McEwen, Superintendent of the Prince Edward Island Railway, Charlottetown, P.E.I.

Parties tendering will be required to accept the fair wages schedule prepared or to be prepared by the Department of Labour, which schedule will form part of the contract.

Contractors are requested to bear in mind that tenders will not be considered unless made strictly in accordance with the printed forms, and in the case of firms, unless there are attached the actual signature, the nature of the occupation, and place of residence of each member of the firm.

An accepted bank cheque for the sum of $50,000 made payable to the order of the Minister of Railways and Canals, must accompany each tender, which sum will be forfeited if the party tendering decline entering into contract for the work, at the rates stated in the offer submitted.

The cheque thus sent in will be returned to the respective contractors whose tenders are not accepted.

The cheque of the successful tenderer will be held as security, or part security, for the due fulfilment of the contract to be entered into.

The lowest or any tender not necessarily accepted.

By order,

L. K. JONES,
Asst. Deputy Minister and Secretary.
Department of Railways and Canals,
Ottawa, 18 February, 1913.

Newspapers inserting this advertisement without authority from the Department will not be paid for it. 36655 11-12

COUNTY OF CARLETON

Tenders Wanted

Sealed tenders addressed to Chas. Macnab, County Clerk, Ottawa, and marked "Tender for Dunn Bridge," will be received up to 12 o'clock noon, **Tuesday, April 1st, 1913**, for the construction of a bridge between Counties of Carleton and Lanark opposite Lot 30 in first Concession Marlboro. Plans and specifications can be seen in County Clerk's office Ottawa, and at Mr. Pattie's office, Carleton Place.

CHAS. MACNAB,
County Clerk.
Ottawa, Ont.,
March 4, 1913. 11-12

The Regina Public School Board

Tenders, sealed and endorsed on envelope "Tenders for School Building, Block 53, Broder's Annex, Regina," will be received by the undersigned up to 12 o'clock noon, **Thursday, March 20th, 1913**, for work and material in all trades (except plumbing, heating and ventilating) required in the erection and completion of a Public School Building.

Each tender must be accompanied by a marked cheque for five per cent. of the amount of the tender made payable to the Chairman of the Public School Board, the successful tenderer to have this cheque returned upon furnishing satisfactory bond for ten per cent. of the amount of the contract, conditional for the due and proper performance of the work. The deposit of the unsuccessful tenderers will be returned when the contract is signed.

The right to reject any or all tenders or to waive any defects or irregularities therein, is to be at the discretion of the Board.

Plans, specifications, form of tender and all information may be obtained on application to the undersigned.

J. H. PUNTIN, Architect.
308 Darke Bldg., Regina, Sask.
March 1st, 1913. 11-12

CITY OF PORT ARTHUR

NOTICE

Sealed tenders, endorsed on the envelope "Tenders for Railway Material," will be received by the undersigned up to 5 o'clock p.m. of **Monday, March 31st, 1913**, for the supply of the following Railway Material to be delivered F. O. B. cars Port Arthur, via Boat and Rail, before May 20th.

Tender A.
No. 2/0 Round Trolley Wire, 8 tons.
No. 4/0 Flexible Feeder Wire, D. B. W. P., [illegible]

Tender B.
21,200 ft. 80-lb. 5-in. Tee Rails.
50,000 ft. 60-lb. 5-in. Tee Rails.
[illegible] 9-16.
840 pair Angle Bars, 80-lb. Rail, 4 hole.
[illegible]
[illegible] Hex. [illegible]
[illegible] Hex. Nuts.

Tender C.
Steel Intersections, Frogs, Switches, etc.

Further instructions as to spectifications, blue prints, and form of tender may be obtained from the City Engineer and the undersigned.

A marked cheque for 10 per cent. of the estimated amount of the contract must accompany each tender.

The lowest or any tender not necessarily accepted.

J. J. HACKNEY,
Commissioner Utilities.
[illegible] Offices, Port Arthur,
March 5th, 1913. 11-13

Sealed tenders addressed to the undersigned, and endorsed "Tender for Repair of Headblock at Port Colborne, Ont.," will be received at this office until 4 p.m. on **Wednesday, April 9, 1913**, for the repair of the headblock of the east breakwater, at Port Colborne, County of Welland, Ont.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the office of J. G. Sing, Esq., District Engineer, Confederation Life Building, Toronto, Ont., and on application to the Postmaster at Port Colborne, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

R. C. DESROCHERS,
Secretary.
Department of Public Works,
Ottawa, March 13, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—37873. 12-13

TENDERS

Sealed tenders addressed to the undersigned at Ottawa and marked on the envelope "Tender for Illuminating oil and oil for kerosene engines," will be received up to noon of the **Thirty-first day of March, 1913**, for the supplying and delivering about 150,000 gallons of illuminating oil and about 50,000 gallons of oil for kerosene engines, both made according to the specifications prepared by the Department of Marine and Fisheries.

The quantities mentioned herein are only estimates, and the Department reserves the right to order larger or smaller quantities as required.

[illegible] cured from the Collectors of Customs at Toronto, Petrolea, and Sarnia, and from the Agents of this Department at Montreal, Quebec, St. John, Halifax and Charlottetown, [illegible] the Purchasing and Contract Agent, Marine Department, Ottawa.

Each tender must be accompanied by a deposit cheque equal to five per cent. of the total amount [illegible]

All tenders must be made on the tender form [illegible]

[illegible] strictly in accordance with the specifications and put up in packages as called for in said speci- [illegible] must be submitted.

The Department reserves the right to accept the whole or any part of a tender.

[illegible] accepted.

[illegible]

ALEX. JOHNSTON,
Deputy Minister of Marine and Fisheries.
[illegible]
[illegible]

Concrete Bridges

[illegible] will be received by C. H. [illegible] up to noon [illegible] April 4th for the building of five re-inforced concrete bridges in the Township of [illegible]

[illegible] apply to

J. NIGH, Esq., Reeve,
Elmira, Ont.,
[illegible] Engineers,
12 [illegible] Street, Toronto, Ont

BRIGHTON, ONTARIO

Proposed Waterworks

Tenders for Steel Piping, Specials, Valves, Hydrants, etc., are required.

Approximate quantity:—
10 inch piping, 11,600 feet.
6 inch piping, 21,500 feet.
[illegible]
49 6 inch Gate Valves.
6 10 inch Gate Valves.

Specifications and form of tender may be had at the offices of the undersigned Engineer.

Tenders to be sent in not later than April 7th to the Clerk of the Municipality, Brighton, Ont.

By order,
T. LOCKWOOD, Clerk,
R. J. ROSS, Reeve.
T. AIRD MURRAY, Engineer,
12 [illegible] Bldg., Toronto, Ont.

TOWN OF WATROUS

Province of Saskatchewan

Notice to Contractors

Sealed tenders will be received by the Secretary-treasurer of the Town of Watrous until 8 p.m. on **Monday, April 14th, 1913**, for the following [illegible]

Contract A.—Labor for Laying Water Pipes and Sewers.

Contract T.—Concrete Sidewalks.

Plans, specifications, etc., may be seen at the Town Hall, Watrous, or at the Engineers' offices, Winnipeg and Toronto, on and after **March 15th**, [illegible]

No tender necessarily accepted.

E. MEADOWS, Esq., Mayor,
F. C. WRIGHT, Esq., Secretary-treas.,
CHIPMAN & POWER, Engineers,
12 Mail Bldg., Toronto, Ont.

TENDERS

Sealed tenders addressed to W. J. McCaffrey, Indian Agent, Maniwaki, Quebec, will be received up to noon, **Saturday, April 5, 1913**, for the construction of concrete abutments for a bridge over Conger Creek in the Maniwaki Indian Reserve, County of Wright, Quebec.

Plans may be seen at the office of the said agent or at the Department of Indian Affairs, Ottawa.

The lowest or any tender not necessarily accepted.

The unauthorized insertion of this advertisement in any newspaper will not be paid for.

J. D. McLEAN,
Assistant Deputy and Secretary.
Department of Indian Affairs,
—37677. Ottawa, March 3, 1913. 11-13

Tenders Wanted for Cast-iron Water Pipe

Sealed tenders, addressed to J. F. Smyth, Esq., Chairman Water Commissioners, Windsor, Ont., will be received by the undersigned up to 12 o'clock noon on **Tuesday, March 25, 1913**, for 400 tons, more or less, of cast iron water pipe, size from 6-in. to 12-in.; also specials, consisting of crosses, tees and bends, according to standard specifications of the Canadian Society of Civil Engineers. Delivery of 50 tons to begin fifteen days after notification of acceptance of tender, and balance continued as required. Delivery to be f.o.b. cars, Windsor, Ontario.

A certified cheque for six hundred dollars, payable to the Water Commissioners, Windsor, Ont., must accompany each tender, which cheque will be subject to forfeiture in case of failure on the part of the successful tenderer to enter into a suitable agreement, or contract with approved sureties or approved surety company's bond, when called upon to do so.

The cheque of the unsuccessful tenderer will be returned at once.

The right is reserved to reject any or all tenders, or to accept any tender.

W. A. HANRAHAN, Secretary,
Room 3, City Hall, Windsor, Ont.
Windsor, Ont., March 8, 1913. 12

CITY OF REGINA

Waterworks Department

Sealed tenders will be received by the City Commissioners up till noon, 12 o'clock, **April 9th, 1913**, for the supply and delivery F.O.B. cars, Regina, of the following—

Contract B

Approximately—
77637 lin. ft. of 6-in. cast iron pipe.
7180 lin. ft. of 8-in. cast iron pipe.
2983 lin. ft. of 10-in. cast iron pipe.
1140 lin. ft. of 12-in. cast iron pipe.
9958 lin. ft. of 16-in. cast iron pipe.
10941 lin. ft. of 18-in. cast iron pipe.
16712 lin. ft. of 24-in. cast iron pipe.
96.02 tons Specials.

Contract C

Approximately—
105 tons ¾-inch lead pipe.
25 tons 1-inch lead pipe.
4500 lin. ft. 2-in. galvanized pipe and couplings.
500 lin. ft. ¾-in. galv. pipe and couplings.
1000 lin. ft. 1-inch black pipe.
123½ tons pig lead.
5 tons braided jute rope.

Contract D

Approximately—
150 2-in. brass gate valves.
271 6-inch iron body gate valves.
29 8-inch iron body gate valves.
4 10-inch iron body gate valves.
2 12-inch iron body gate valves.
15 16-inch iron body gate valves.
13 18-inch iron body gate valves.
13 24-inch iron body gate valves.
1 18-inch check valve.
348 valve boxes.
190 6-inch fire hydrants.
10 8-inch fire hydrants.

Contract E

Approximately—
1750 ¾-inch Corporation Cocks.
800 1-inch Corporation Cocks.
1750 ¾-inch Curb Cocks.
800 1-inch Curb Cocks.
300 ¾-inch lead to lead unions.
200 1-inch lead to lead unions.
150 1-inch four-way branches.
1500 No. 2 curb boxes.
200 No. 4 curb boxes.
200 curb box tops.

Specifications and other information may be obtained at the office of the undersigned.

A marked cheque for five per cent. of the bid must accompany each tender.

Lowest or any tender not necessarily accepted.

J. M. MACKAY,
12-14 Supt. of Waterworks.

CITY OF VERNON, B. C.

Tenders for 500 BHP Diesel Engine and 375 Kw. Generator

Tenders will be received up to 3 p.m., **April 11th, 1913, by** D. G. Tate, City Clerk, Vernon, B.C., for the following equipment:

Supply and installation of one 500 B.H.P. Diesel Engine.

Supply and installation of one 375 kw. 2300 volt, three phase, sixty cycle, generator with direct connected exciter.

Supply of one ten-ton travelling crane.

Specifications may be seen after March 20th, at the City Hall, Vernon, B.C., the offices of the Electrical News, and Canadian Engineer, Toronto; the Contract Record, Winnipeg; and the Consulting Engineers, Vancouver.

MATHER, YUILL & COMPANY, LTD.,
Consulting Engineers,
12-14 Vancouver, B.C.

Town of North Battleford

Province of Saskatchewan

Water Works, Sewerage Works, and Concrete Sidewalks

Sealed tenders will be received by the Secretary-treasurer of the Town of North Battleford, until 8 p.m., **Tuesday, April 15th, 1913**, for the following works:

Contract A.—Pipelaying on Waterworks and Sewers.

Contract B.—Furnishing Cast Iron and Steel Water Pipes and Specials.

Contract E.—Fire Hydrants and Gate Valves.

Contract S.—Furnishing Vitrified Tile Sewer Pipe and Junctions.

Contract T.—Constructing Concrete Sidewalks and Curbs.

Plans and specifications may be seen at the office of the Engineers, Toronto and Winnipeg, and at the Town Hall, North Battleford, on and after March 17th, 1913.

The lowest or any tender not necessarily accepted.

D. S. WALKER, Esq., Mayor,
North Battleford, Sask.
H. W. DIXON, Esq., Secretary-treas.,
North Battleford, Sask.
CHIPMAN & POWER, Con. Engineers,
12 Toronto and Winnipeg.

Wanted

One good second-hand stone crusher, complete; in good working order. Address Box 655, Belleville, Ont. 10-T.F.

For Sale

Dredge and Derrick and Tug, Portable Crusher, and 20 horse power Boiler and Engine, 12-ton Case Roller, "steam steerer," 19 Dump Waggons, Wheel and Drag Scrapers, Shovels, Hammers and Picks. All in good working order and cheap. Apply to H. A. Camjaigne, Niagara House, Niagara Falls, Ont. 10-T.F.

McMyler Derricks For Sale

Locomotive cranes, clam shell buckets, hoisting engines, steam shovel, pile driver, steam hammer, diving suits, stiff leg derricks, turnover buckets, two (2) marine engines, boilers, fuel lighter with whirley aboard. Address

Cleveland & Erie Machinery Co.
C **1515 Rockefeller Bldg., Cleveland, O.**

CITY OF LONDON, ONT.

Tenders For

Highway Bridge

Over the River Thames

Sealed proposals addressed to the "Chairman and Members of No. 2 Committee," will be received at the Office of the City Clerk until 5 p.m. on Thursday, April 10th, 1913, for the following work:—

(a) Construction of concrete piers and abutments.

(b) Erection of Three 130 foot span riveted steel trusses.

(c) Construction of reinforced concrete flooring.

Each bidder shall make his tender on the form furnished by the City Engineer.

Plans and specifications and form of tender may be seen at and obtained from the office of the City Engineer.

Contractors to enclose a marked cheque for ten per cent. (10 p.c.) of the amount of their bid.

The City reserves the right to reject any or all bids and to accept any bid.

B. W. BENNETT,
Chairman No. 2 Committee.
H. A. BRAZIER,
11-13 City Engineer,

For Sale

Dredging Plant complete. Capacity 1,200 to 1,500 cubic yards per day, including Tug and three Scows. In first class condition. Box 750, Contract Record, Toronto, Ont.

Plant For Sale

2 Model 30 Marion Steam Shovels.
28 Steel Frame Petlor Dump Cars, 1½ yard, 24-inch gauge.
3 Western End Dump Cars, 3 yd., 36-in. gauge.
1 Beatty Travelling Derrick, 50 ft. boom.
40 tons 20 lb. Relaying Rail.

JOHN J. GARTSHORE,
12-13 58 Front St. West, Toronto.

Concrete Block Proposition

Parties operating [illegible] gravel wish to engage a man with plant to manufacture Concrete Blocks, Bricks or Sand Lime Bricks. Good location, Niagara Peninsula. Plenty of water; cheap electric power; railway sidings; close to several cities. Liberal proposition. Write now to Box 739 Contract Record, Toronto, Ont. 11-12

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors [illegible] tract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect

No extra charge is made for filing plans at one or all four offices.

Contract Record and Engineering Review

Montreal—B31 Board of Trade
Toronto—220 King Street West.
Winnipeg—Commercial Travellers' Bldg.
Vancouver—420 Pender Street.

Wanted

Architects—Hospital—To submit sketches of surgical and medical wings for small hospital. Write to Mrs. R. S. McLaughlin, Sec. of Building Committee, Oshawa, Ont. 12

We require an active representative in a number of towns throughout Canada to report on building and engineering work; to tell us where machinery, equipment, supplies and materials may be sold. It requires but a few moments daily to obtain the information we desire and should not interfere with your present occupation. Reply immediately, stating your qualifications.

MacLean Daily Reports Limited.
12-13 220 King St. West, Toronto, Ont.

The Corporation of the City of Cranbrook

Appointment of City Engineer

Applications are invited for the position of City Engineer for the Corporation of the City of Cranbrook.

Applicants would kindly state experience and salary required. Applications should be addressed to the undersigned so as to be received by March 29th, 1913.

T. M. ROBERTS, City Clerk.
Dated at Cranbrook, B.C.,
this 11th day of March, 1913. 12

Situations Vacant

[illegible] draughtsman, good salary and permanent position. Communicate at once with H. C. McBride, Architect, London, Ont. 11-12

Situations Wanted

Young man, University graduate, with several years' experience, would like position with reliable firm of architects. Apply Box 736, Contract Record, Toronto, Ont. 11-14

To Architects and Builders

Advertiser requires a position as Superintendent or General Manager; used to carrying out large building contracts. Can give excellent references. Francis, Glen Road, Leigh-on-Sea, [illegible] 12

Residences

(Continued from page 77)

[illegible]

[illegible]

Residence, cost $4,000, Richmond. Owner and builder, F. E. Harley, c/o [illegible] pressed brick construction, stone and cement [illegible]

Montreal, Que.

[illegible] Owner and builder, A. Lamarche, 1778 Iberville [illegible] pressed brick construction.

[illegible] Mr. James Scalia, 31 Torrance street. Architect, James Adamson, 127 Stanley street. General contractors, Purves & Henderson, St. Antoine street. Three storeys, 39 x 39, solid brick construction.

Three flats, cost $5,000, Christopher Columbus. Owner and builder, C. Thinette, 1354 St. Denis. Three storeys, 27 x 70, brick construction, cement foundation.

Residence, cost $4,000. Owner and builder, Morrel Perquin, 535 Plante Ave. Cement foundation, brick construction. Plans drawn.

Residence, cost $10,000, for A. J. Dawes, Lachine. Architects, Wadsworth & Henderson, New Birks Building, Montreal. General contractors, Thompson & Paul, Lachine. Sub tenders are now being received by General Contractors. Two storeys, 38 x 43, wood and stucco construction, cement foundation.

Ottawa, Ont.

Residence, cost $3,500, for A. W. G. Harris, 45 Roseberry. General contractor, H. G. Stanley, 287 Flora. Brick veneer construction, stone foundation.

Port Arthur, Ont.

Three residences, cost $12,000, for Col. S. W. Ray. Architect and general contractor, Geo. H. Otto, Room 14 Walsh Block. Painting, Robertson & Cantwell, 428 George street, Fort William. Interior fittings, Geo. H. Otto. Two stys., 28 x 28, red clay and brick veneer construction, cement foundation.

Prince Albert, Sask.

Residence, cost $3,500. Architect and general contractor, H. L. Bartlett. Three storeys, 30 x 40, cement foundation, frame construction.

Red Deer, Alta.

Residence, cost $3,000, 2nd street south east. Owner and general contractor, L. Kennedy. Two storeys, 30 x 30, frame, cement foundation.

Regina, Sask.

Residence, cost $7,000, for Dr. J. A. Cullum, 2715 Victoria avenue. Architect and general contractor, S. K. Powell, 2060 Rae street. 2½-storeys, 22 x 32, frame and brick veneer construction, brick foundation.

South Edmonton, Alta.

Residence, cost $3,500, for J. W. Bush, 474 5th avenue northeast. General contractor, A. Moreside, 628 1st Ave., northeast. 2½-storeys, 24 x 28, frame, cement foundation.

12 detached residences, cost $38,000, 2nd street south, for C. W. Chadwick, c/o The Colonial Realty & Securities Corp., Ltd., Lumsden Building, Toronto, Ont. Architect and general contractor, Jas. Turner, 524 10th avenue northeast. 25 x 35, 8 rooms, frame construction, concrete foundation.

St. Catharines, Ont.

Residence, cost $5,000, Duke street, for Mrs. Agnes Crawford. General contractor, W. Harrop, 17 Haynes avenue. Two storeys, 24 x 34, brick construction, stone foundation.

Sarnia, Ont.

Residence, cost $3,800, Kathleen. Owner and builder, Thos. Grace. 1½ storeys, white brick construction, stone [illegible]

South London, Ont.

[illegible] Owner and builder, G. S. Young, Ridout street and Tecumseh avenue 1½-stys., white brick construction, stone and cement foundation.

Toronto, Ont.

Residence, cost $13,000, St. Clair and Spadina road, for L. J. Applegath, 155 Yonge street. Architect, C. J. Gibson, Janes Bldg. Mason, J. W. Gratton, 438 Clinton street. Carpenter, P. J. Corcoran, 306 St. Clarens. Two storeys, stone and brick foundation, stone and brick construction.

Residence, cost $6,500, St. Clair Ave., for R. H. Doney, 63 Summerhill. Architect and builder, F. J. Madill, 52 Alber[illegible] storeys, [illegible] x 42, brick construction, stone foundation.

Residence, cost $30,000, Roxboro east, for James Ryrie, 400 Jarvis street. Architects, Burke, Horwood & White, 28 Toronto street. General contractors, H. N. Dancy & Son, 220 Howland avenue. 2½-storeys, 8 ft. 6 in. x 62 ft., brick foundation, stone and brick construction.

Two pair residences, cost $10,000, Indian road. Owner and builder, W. J. White, 108 Geoffrey street. 2½-storeys, 33 x 53, stone foundation, brick construction.

Apartment, cost $18,000, Cumberland street. Owners and general contractors, J. T. & H. Hutson, 43 Victoria street. Architect, J. H. Galloway, 23 Toronto street. Three storeys, brick foundation and construction.

Two residences, cost $7,000, Hogarth avenue. Owner and builder, G. H. McLaughlin, 54 Hogarth avenue. Architect, P. H. Finney, 79 Adelaide east. 2½-storeys, brick construction.

Residence, cost $4,500. Owner and builder, J. C. Corti, 421 Markham street. Two storeys, 24 x 30, stone foundation, brick construction.

Residence, cost $18,000, Russell Hill road, for A. A. Morrice. Architects, Eden Smith & Son, 199 Yonge street. Mason, Thomas Bros., 420 Dupont St. Carpenters, Woodley & Son, Peter St. 2½-storeys, 32 x 45, structural steel and brick construction.

One detached residence, cost $8,000, Roxborough. Owner and builder, H. G. White, 274 Delaware avenue. 2½-stys., 32 x 40, brick foundation and construction.

14 attached residences, cost $50,000, Langley and Broadview. Builders, Oliver Reid & Co., 43 Adelaide street east. Two storeys, 20 x 36, each, cement foundation, brick construction. Plans drawn.

One detached residence, cost $4,000, Owner and builder, R. J. Hoidge, 392 Dupont street. Two and a half storeys, 26 x 31, stone foundation, brick construction.

Four pair residences, cost $23,000. Owner and builder, E. G. McBride, 14 Cedar avenue. 2½-storeys, 32 x 38, brick foundation and construction.

Vancouver, B.C.

Residence, cost $18,000, 1714 17th Ave, for E. Francis, care Architect, J. C. MacKenzie, 330 Horner street. General contractor, R. Bond, 2377 5th avenue. 2½-storeys and basement, stone foundation.

Winnipeg, Man.

Two apartment blocks, cost $35,000 each, Toronto street, for Johnson & Bildfell, Union Bank Building. Architect, Paul M. Clemens, 331 Garry street, Winnipeg. General contractor, S. Palmerston, Agnes street. Three storeys and basement, concrete foundation, pressed and common brick construction.

Two residences, cost $7,000, Lipton, Architect and general contractor, W. A. Tweed, 791 William avenue. Two stys., 19 x 38, stone foundation, frame construction. Excavating started.

Power Plants, Electricity and Telephones

Dundas, Ont.

Hydro-Electric Power Co., Bay and Richmond streets, Toronto, has tentative plans for a new district to be opened in Wentworth and Lincoln Counties, by which it is proposed to establish a distributing station in the Village of Grimsby from which point power and light would be distributed to points east and west.

L'Avenir, Que.

L'Avenir Telephone Co. has just been organized and will require general telephone supplies, with exception of poles which have been contracted for. Manager, Tel Allard.

Ottawa, Ont.

Telephone exchange for Bell Telephone Co., Queen street. Manager, J. E. MacPherson. The property has been purchased and plans will be prepared.

Regina, Sask.

Tenders received by City Commissioners until April 30th, for 1 1200 kw. synchronous motor generator or motor Converter set complete, with panel for control of A.C. motor and generator and for control of D.C. generator. Specifications, etc., at office of Supt. E. W. Bull. Supt. of Light and Power, E. W. Bull.

Windsor, Ont.

Electric lighting equipment. Tenders received by Clerk, Stephen Lusted, until March 25th for 1 generator for incandescent lighting for a 260 h.p. engine, 100-125 ornamental cast iron poles 13 ft. 6 in. high, 5-light cluster 6 in. standard globe holders suitable for underground wiring system.

Winnipeg, Man.

One 9,000 kw. transformer, cost $13,000. Engineer, J. G. Glassco, 54 King street. General contractors, the Canadian Westinghouse Co., Portage ave. M. Peterson, Secretary, Board of Control.

Tenders received by Secretary until March 26th, 1913, for 2 potential feed regulators for electric power distribution system. Engineer, J. G. Glassco, 54 King street. Specifications at office of Engineer. Board of Control. Secretary, M. Peterson.

Miscellaneous

Ottawa, Ont.

Tenders will be received by Secretary until March 20th, for a supply of 115,300 barrels of cement, more or less, required for the construction and maintenance of the various canals of the Dominion, to be delivered in such quantities at such places and at such times as may be directed. Specifications, etc., from Purchasing Agent of the Dept. Dom. Govt. Dept. of Railways and Canals. Secretary, L. K. Jones.

Business Notes

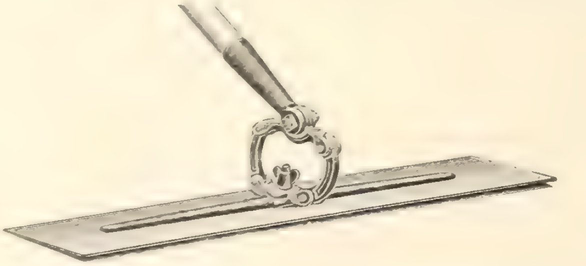
Charlottetown, N.S.

St. Dunstan's R.C. Cathedral burned. Bishop O'Leary. Loss estimated at $300,000.

Montreal, Que.

Offices of Supt. of Lachine Canal burned, 278 Wellington street. Owned by Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Loss $15,000, will be rebuilt.

Residence. Owned by Denis Viger, Longueuil, burned, loss $7,000. Will rebuild, brick construction.



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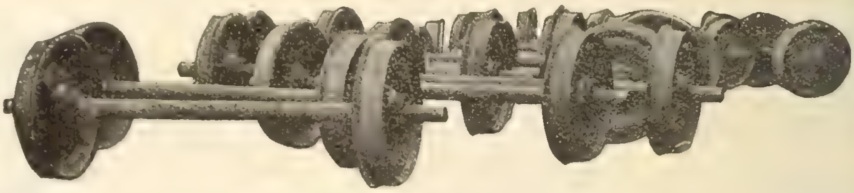

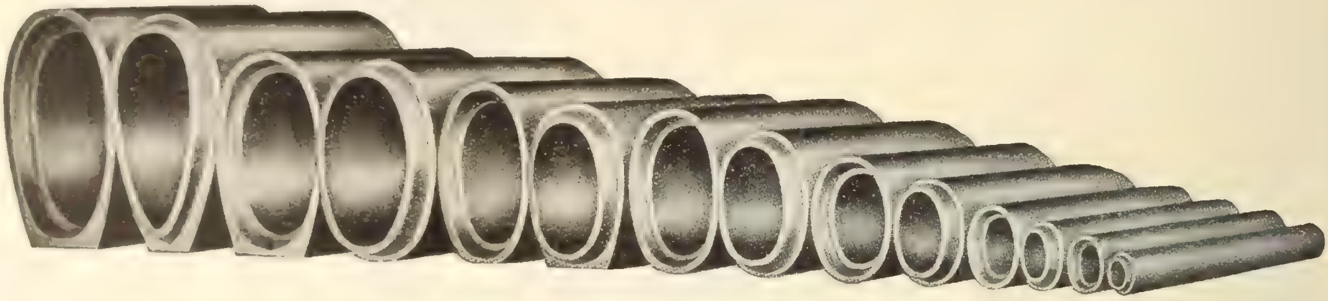

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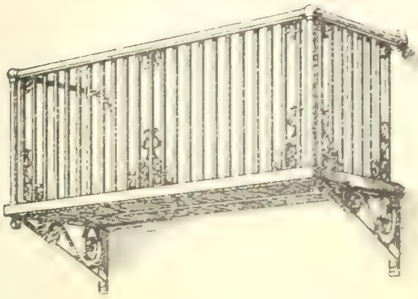

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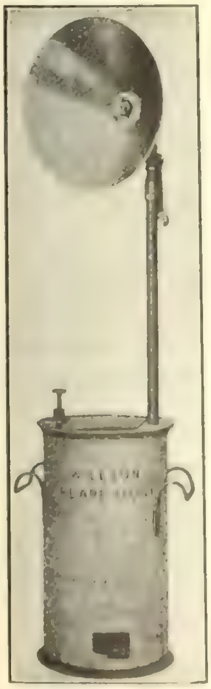

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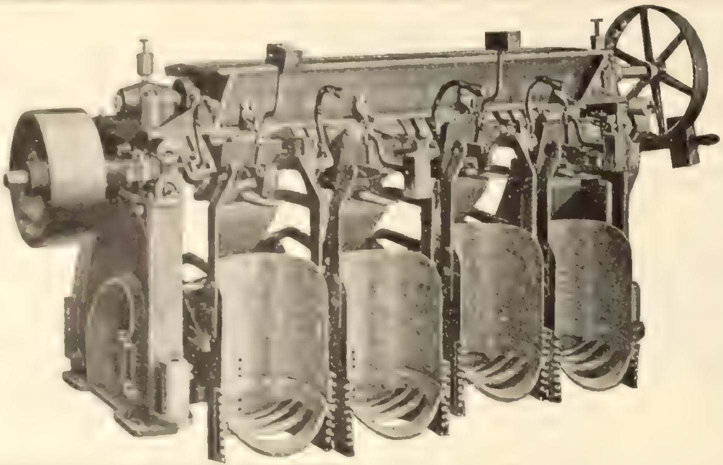

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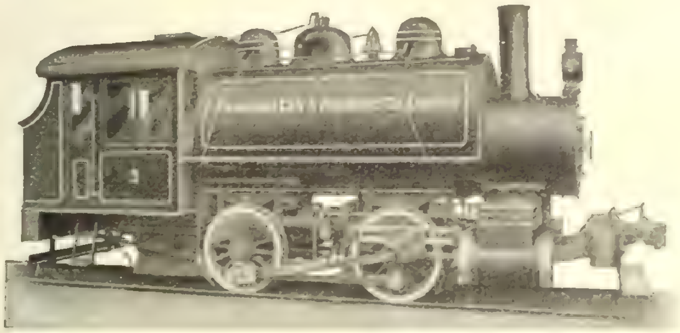

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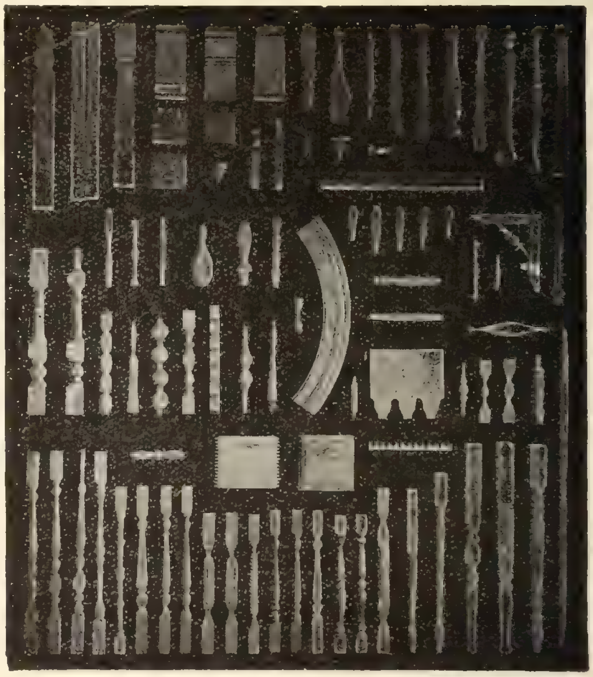

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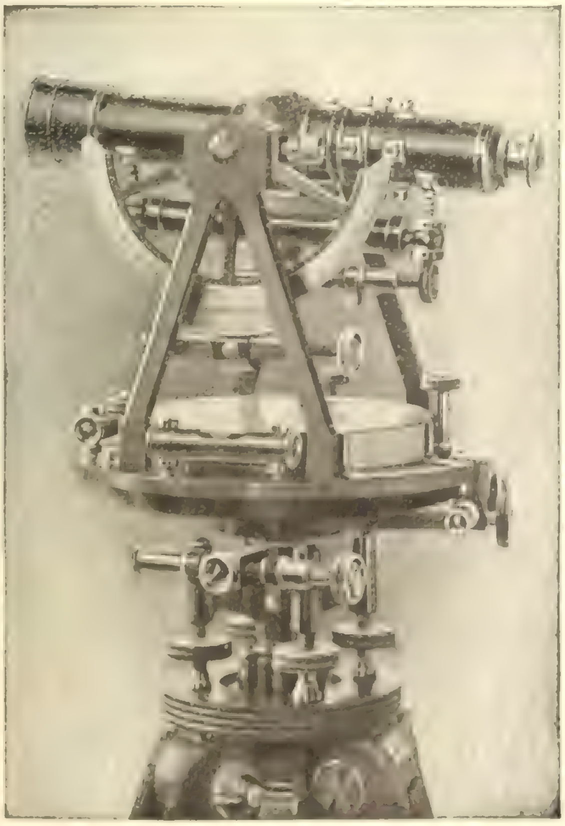

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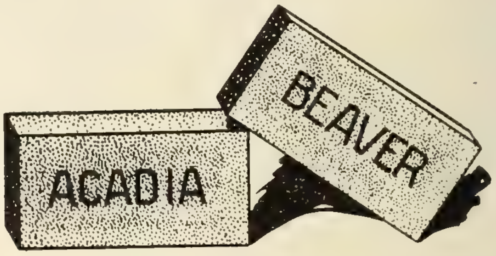

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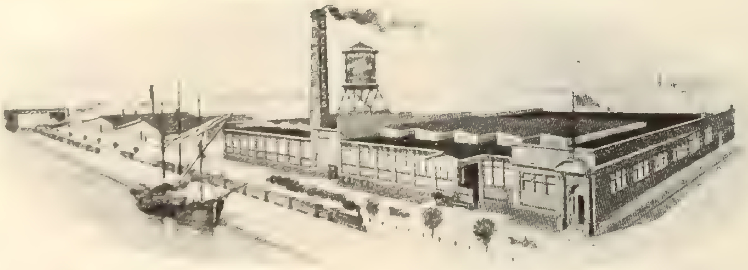

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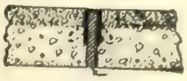
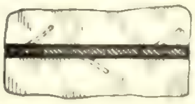


Cross-Section of Pavement Showing Expansion Joint.

Baker Armored Concrete Pavements



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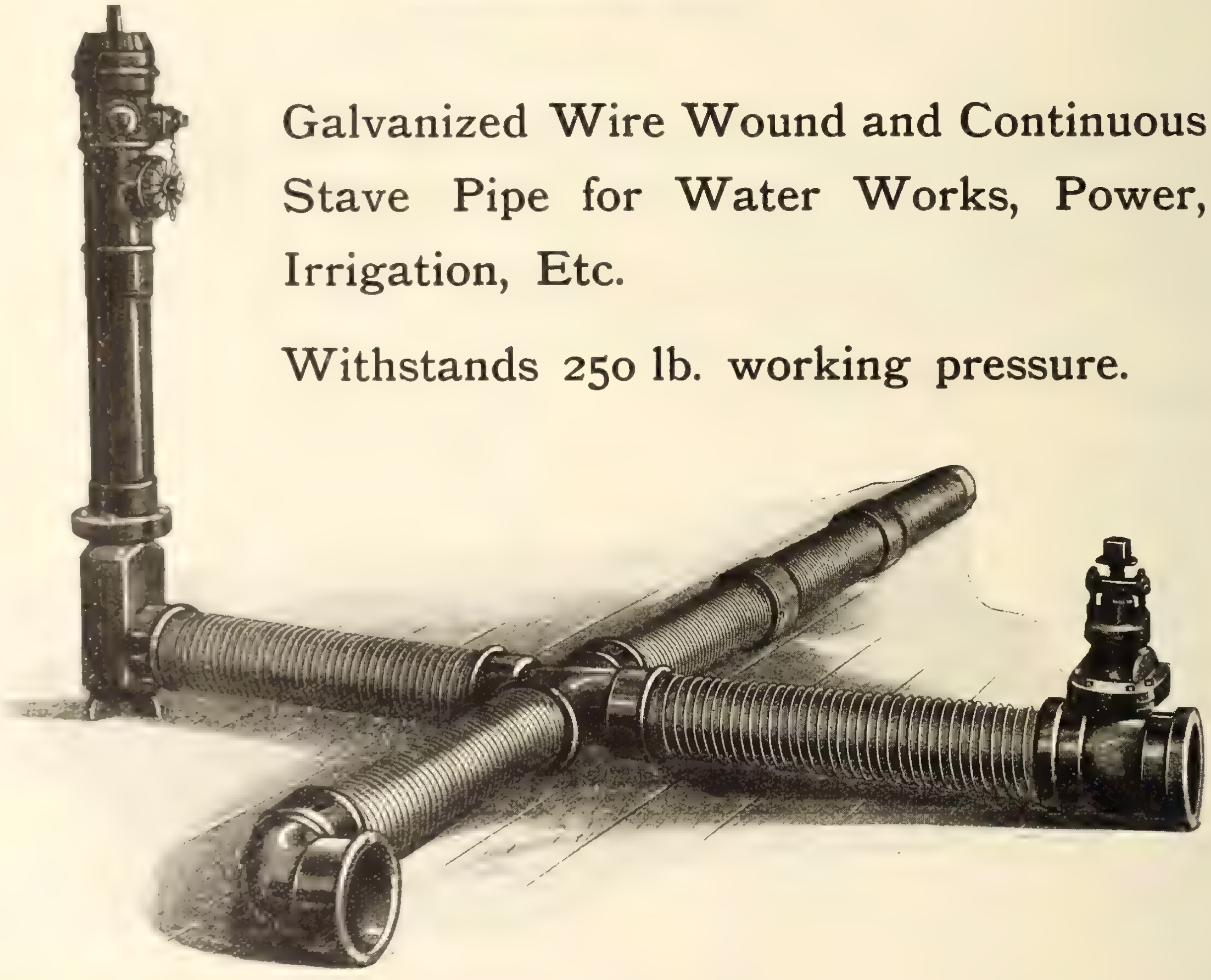

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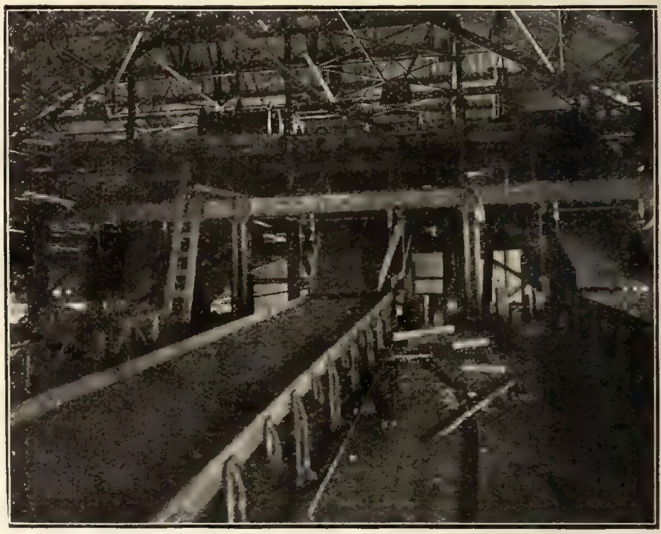

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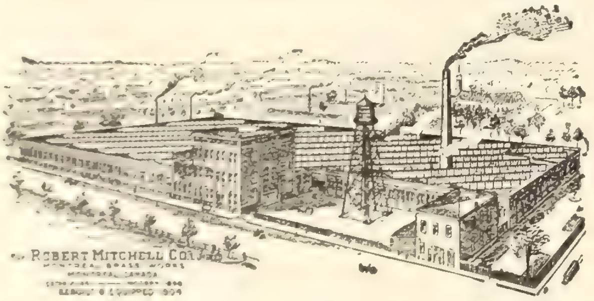

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Designers, Fabricators and Erectors of Structural Steelwork for Bridges and Buildings of every description.

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3 inches to 60 inches diameter

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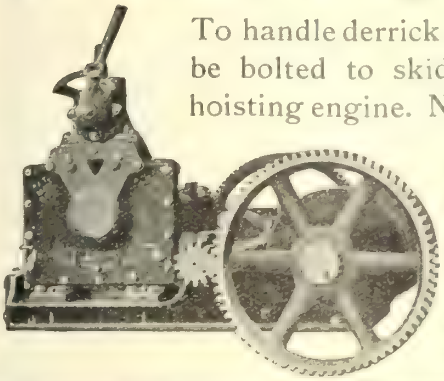

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and you will save money and have a permanently clean-cut masonry job.

Try "Renfrew" on your next job.

Jamieson Lime Company, **RENFREW, ONTARIO**

White Oak Timbers

(FOR SALE)

Sizes	*No. of Pieces and Lengths*			
14 in. x 14 in.	5/30 ft.	1/32 ft.	2/36 ft.	2/37 ft.
14 in. x 16 in.	1/32 ft.	1/30 ft.		
15 in. x 15 in.	1/32 ft.	1/34 ft.		
15 in. x 16 in.	1/32 ft.		Total 8,393 ft. (B.M.)	

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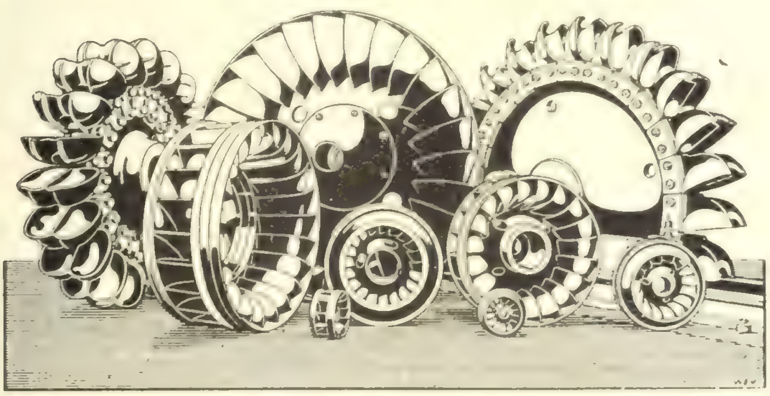

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New York, Dec. 2nd, 1912

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Last summer I used your Ceresit preparation in the building of stone walls and other concrete work in and around my Japanese Garden on Staten Island and I consider the mixing of this material with the cement a great improvement. It seems to make the material less likely to crack and check in setting and I consider it much harder and less likely to break when thoroughly dried. It is also impervious to water.

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Current Prices of Building Material.

BRICKS

[illegible] are wholesale prices delivered at [illegible]

	Per M
No. 1 dry pressed red brick	$18 00
No. 1 dry pressed buff brick	18 00
Red Stock Bricks	13 00
Grey Stock Bricks	13 00
Wire cut bricks for foundation work	12 00
[illegible]	15 00
No 1 enamelled bricks, all colors, from	$80 00 to $150 00

LUMBER (Building Material)

Hemlock lumber—

2 in. x 4 in. to 2 in. x 12 in., 8 to 16 ft.	$26 00	
2 x 4 to 2 x 12, 16 ft.	27 00	
2 x 4 to 2 x 12, 18 ft.	26 00	30 00
1 in. Hemlock, No. 1	26 00	28 00
No. 1 Hemlock Decking	24 00	27 00
No. 2 Hemlock dimension and 1-in.	20 00	22 00

Pine—

1 in. common pine 8 to 12 in. wide [illegible]	27 00	30 00
2 in. white pine Bill stock	29 00	33 00
⅞ x 8 and 10 in. pine shelving..	36 00	40 00
⅞ x 12 in. pine shelving	45 00	
No. 1 white pine flooring	33 00	
[illegible] flooring	28 00	
No. 1 pine decking D2S	30 00	
Spruce Decking	27 00	
No. 1 pine V. or beaded sheeting	36 00	
No. 2 pine V. or beaded sheeting	32 00	

Pine trim for paint finisn—

4 in. casing per 100 ft.	2 00
5 in. casing per 100 ft.	2 50
8 in. pine base, per 100 ft.	3 50
10 in. pine base, per 100 ft.	4 50
[illegible]	2 75

Shingles—

[illegible] shingles, per M.	3 75
N. B. Extras	3 75
N. B. Clears	3 10
No. 1 pine lath, per M.	5 00
No. 2 pine lath	4 50
No. 1 spruce lath	4 00

Cedar Posts Fence—

5 in. at small end, each	25
7 in. at small end, each	35
Hemlock lath	3 50

WINDOW GLASS

Following are the prices of glass at Toronto, Hamilton and London. The discounts are 15 per cent. for Star and 15 per cent. for D.D.

	Star	D.D.
10 to 25 united inches	$4 25	$ 6 25
26 to 40 "	4 60	6 75
41 to 50 "	5 10	7 50
51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]—

MONTREAL

	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
90		9 75
95		10 75
100		12 50

Net prices per 100 feet F.O.B. Montreal.

WINNIPEG

	4ths Single	3rds Double
Up to 25 u.i.	$3 50	$5 00
26/40	3 75	5 50
41/50	4 25	6 25
51/60	4 75	7 00
61/70		8 00
71/80		9 00
81/85		10 00
86/90		11 00
91/95		13 00
96/100		16 00

Net prices per 100 ft. F.O.B. Winnipeg.

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Standard compression work, 60 per cent.

High grade compression work, 55 and 5 per cent.

Fuller work, 65 and 5 per cent.; No. 0, 70 and 10 per cent., and 1 and 2 basin cocks, 70 per cent.

Flatday stop and stop and waste cocks, 60 and 10 per cent.; roundway, 60 and 5 per cent.

No. 4 compression bath cock .... net $1.85

No. 4½ Fuller's .... net $2.50

Square head brass cocks, 60 per cent.

Lead Pipe

Lead pipe, $7.50 net, less 10 per cent.; lead waste, $9.00 net, less 10 per cent.; caulking lead, 6½ cents per lb.; traps and bends, 30 per cent.; pig lead, 6½c. lb.

Iron Pipe

Size (per 100 ft.)	Black		Galvanized
¼ inch	$2.04	¼ inch	$2.86
⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

Cast iron fittings, 65; headers, 65; flanged unions, 70; malleable bushings, 67½; nipples, 4-inch diameter and under, 75 and 10; nipples, 4½-inch and up, 70 and 10; malleable lipped unions, 67½ per cent.

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Medium and extra heavy pipe and fittings, up to 6-inch, 65 per cent.

7 and 8-inch pipe, 50 per cent.

Sewer Pipes

4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in. .. .	1.00 ft.	24-in.	3.25 ft.

all less 65 per cent.

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Cement, barrel lots, in bags, delivered, Toronto, bags extra, $1.80.

Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

Crushed stone, 2-inch, $1.40; 1-inch, $1.45; ⅜-inch, $1.45.

Burnt River rubble stone delivered, $15 to $16 per toise.

Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

Malleable fittings — Canadian discount, 40 and 42½ per cent.

Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.40 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

Lime, per cwt., delivered, not less than 1,500 lbs. 33 cents; white, 43 cents.

Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

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Pure White Lead, ground in oil, $8.50 per 100 lbs.

Boiled Linseed Oil, in bbls., 61c. per gal. of 9 lbs.

Raw Linseed Oil, in bbls., 58c. per gal. of 9 lbs.

Turpentine, in barrels, 66c. per gallon.

Pure Red Lead, dry $6.50 to $7.50 per 100 lbs.

Putty, pure linseed oil, in bulk, bbls., 3½c.

Putty, pure linseed oil, in 25-lb. tins, 4c.

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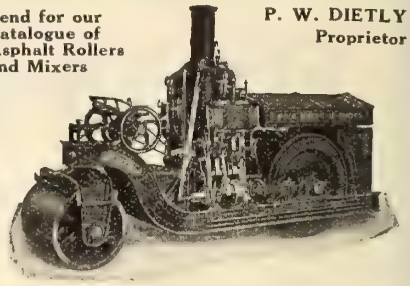

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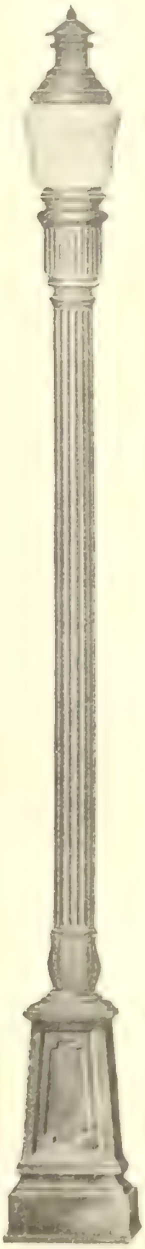

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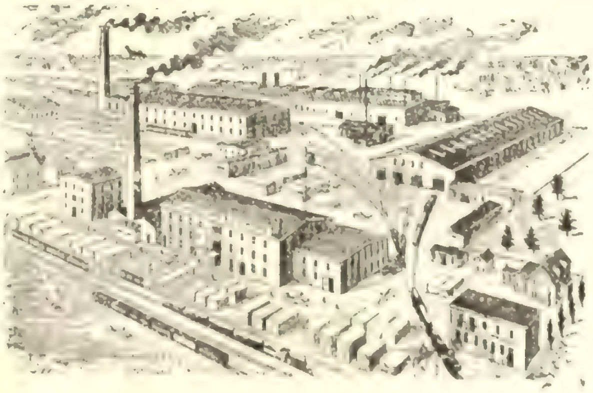

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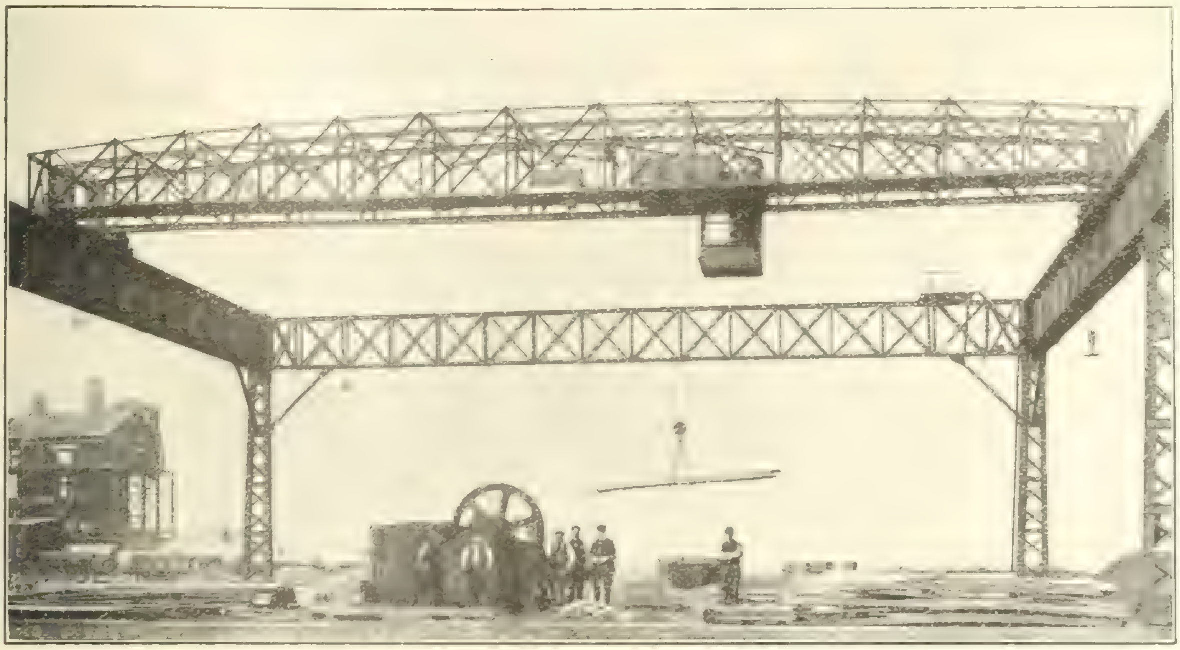

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Deposited 1 cu. yd. of concrete per minute

on the construction of the Fourth Avenue Subway, New York City. This was done day after day with a 2 yd. concrete bucket. Four of these cranes were used on this work by the Tidewater Building Company and Thos. B. Bryson, Contractors. Besides handling the concrete, the cranes were used in excavating, unloading sand and gravel (65 yards per hour), and handling all the heavy material.

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because it is built for a hard and continuous service. Delays are expensive to any contractor and he cannot afford to have a crane that is continually breaking down. The Brownhoist Crane is used by contractors in all parts of this country and we want you to investigate its record. Ask the man who has one.

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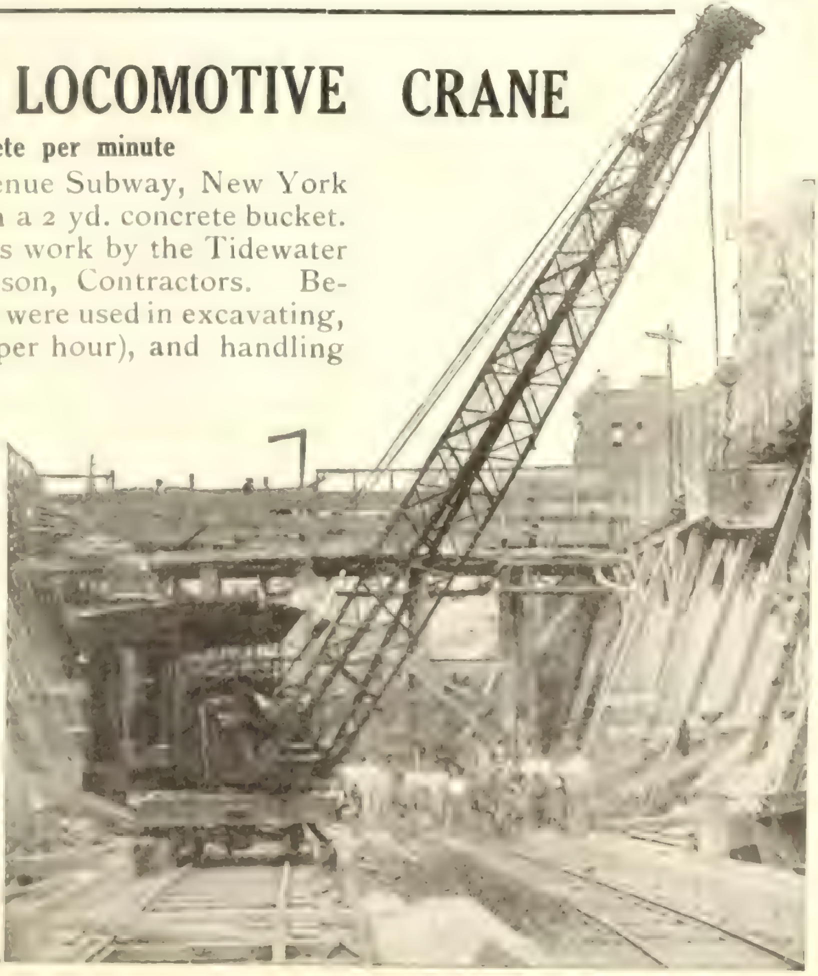

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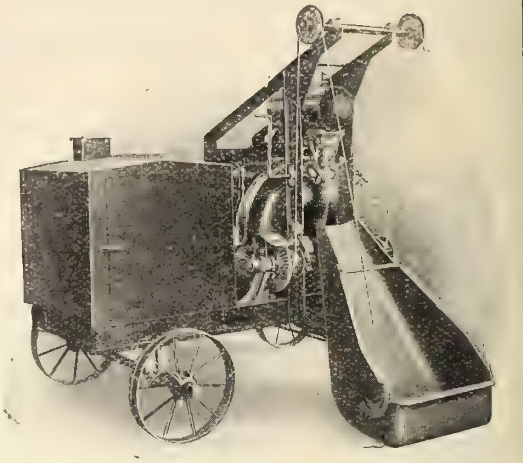

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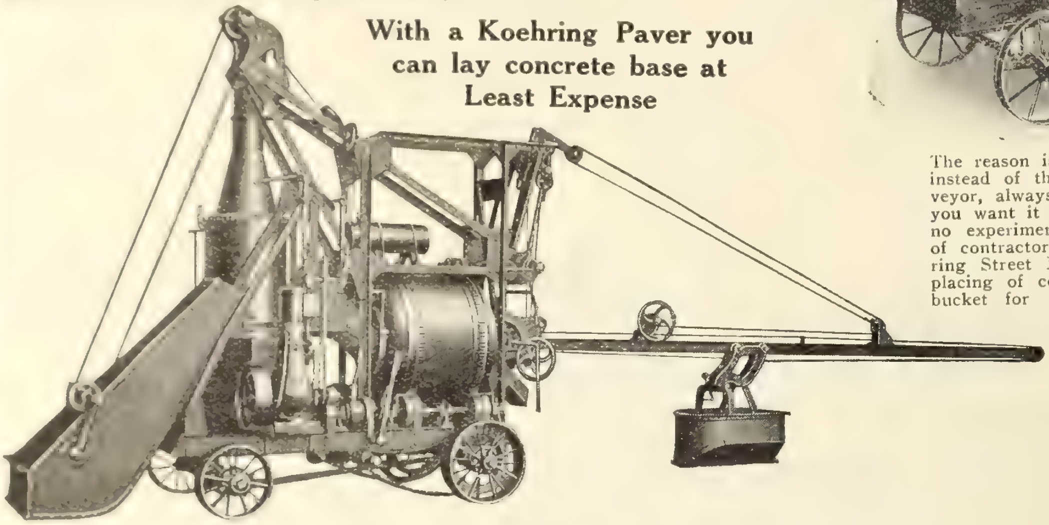

The reason is the machine conveys the concrete instead of the men, and it's a dependable conveyor, always places the concrete exactly where you want it and always dumps clean. There is no experiment about it, the records of dozens of contractors prove the economy of the Koehring Street Paving Mixer and it combines this placing of concrete with a simple charging bucket for getting material into the drum in shortest possible time and least number of men, also, it has traction drive for moving the machine along the line of work and keeping close to the material pile. This builds contractors' reputations and pays handsome profits. Aren't you interested in this reputation and profit making?

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It can be attached directly to steel or wooden framing making a rigid wall without the expense of sheathing the frame with lumber.

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We have the very best materials and we endeavor to manufacture DOMINION WOOD BLOCKS up to the highest possible standard.

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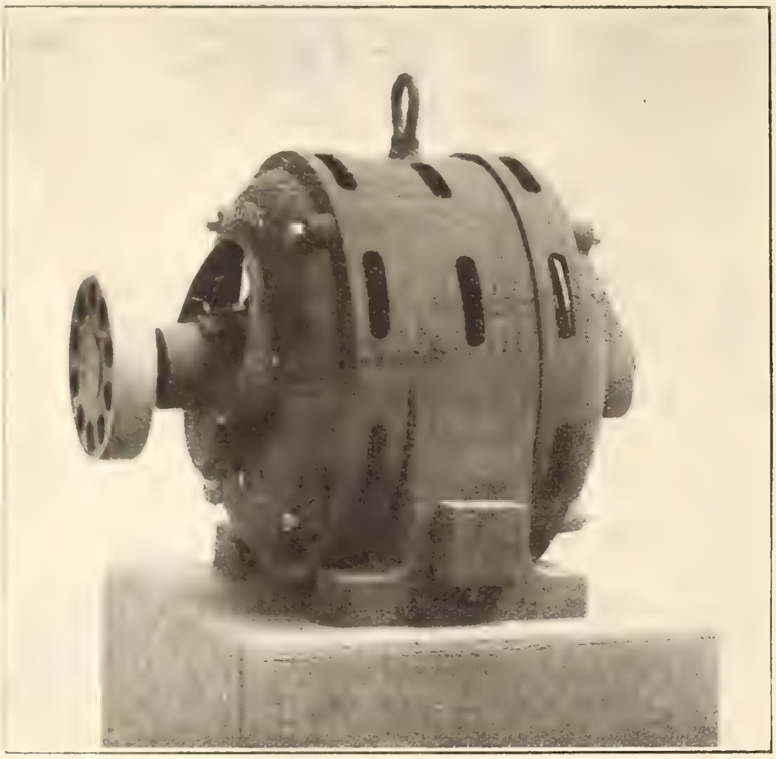

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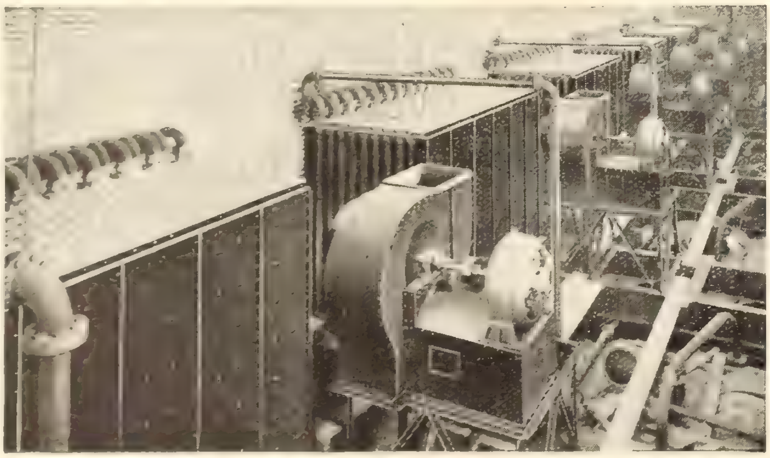

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Expert Builders of

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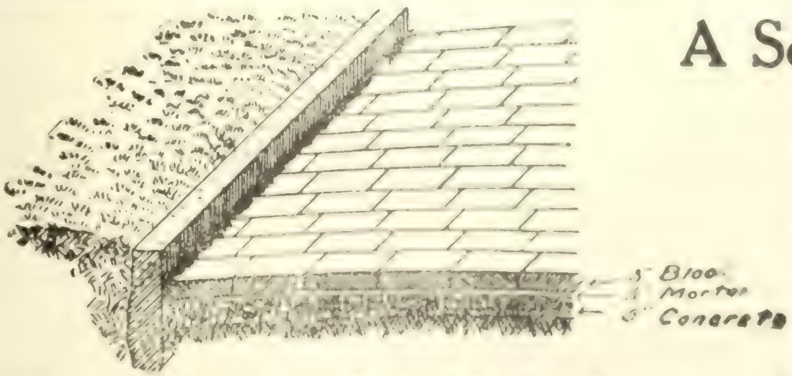

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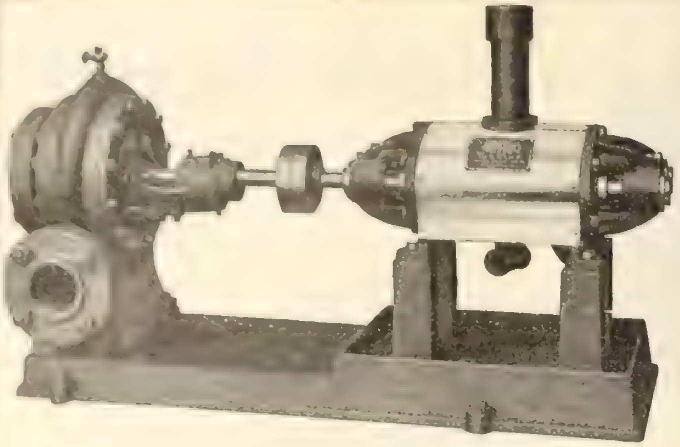

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whether in paste or powder form, will positively Waterproof concrete.

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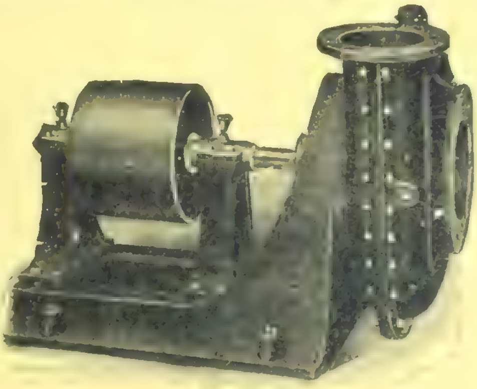
Vol. 27 Toronto, March 26, 1913 No. 13

ESTABLISHED 1886

Contract Record and Engineering Review

Steam and Power Pumps,
Condensers, Travelling Cranes



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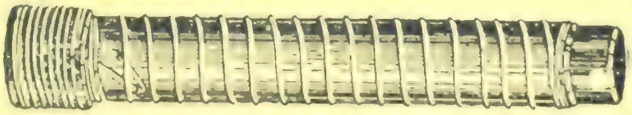

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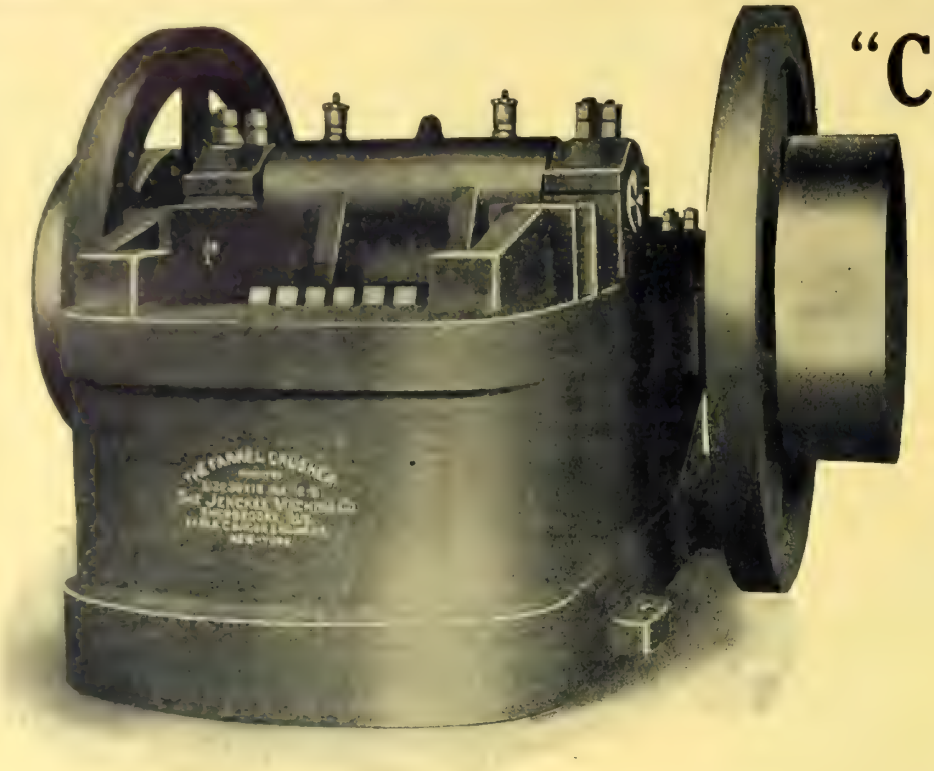

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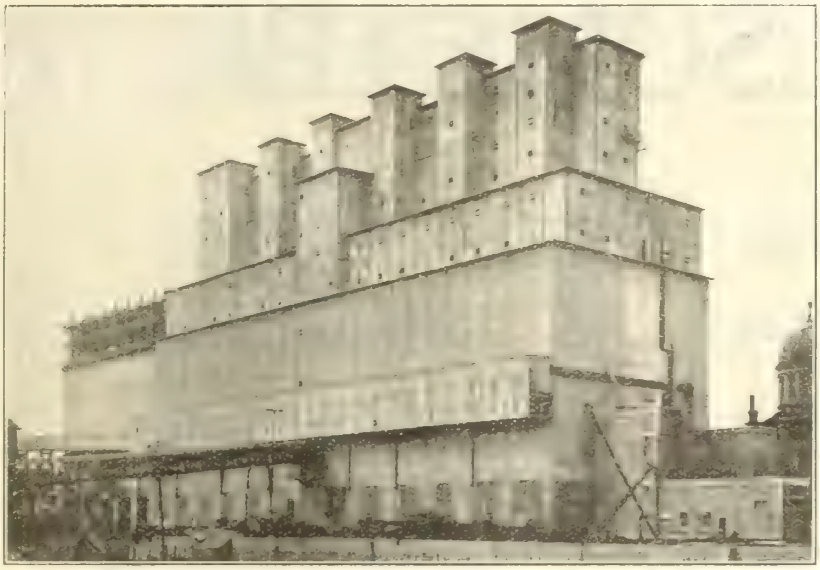

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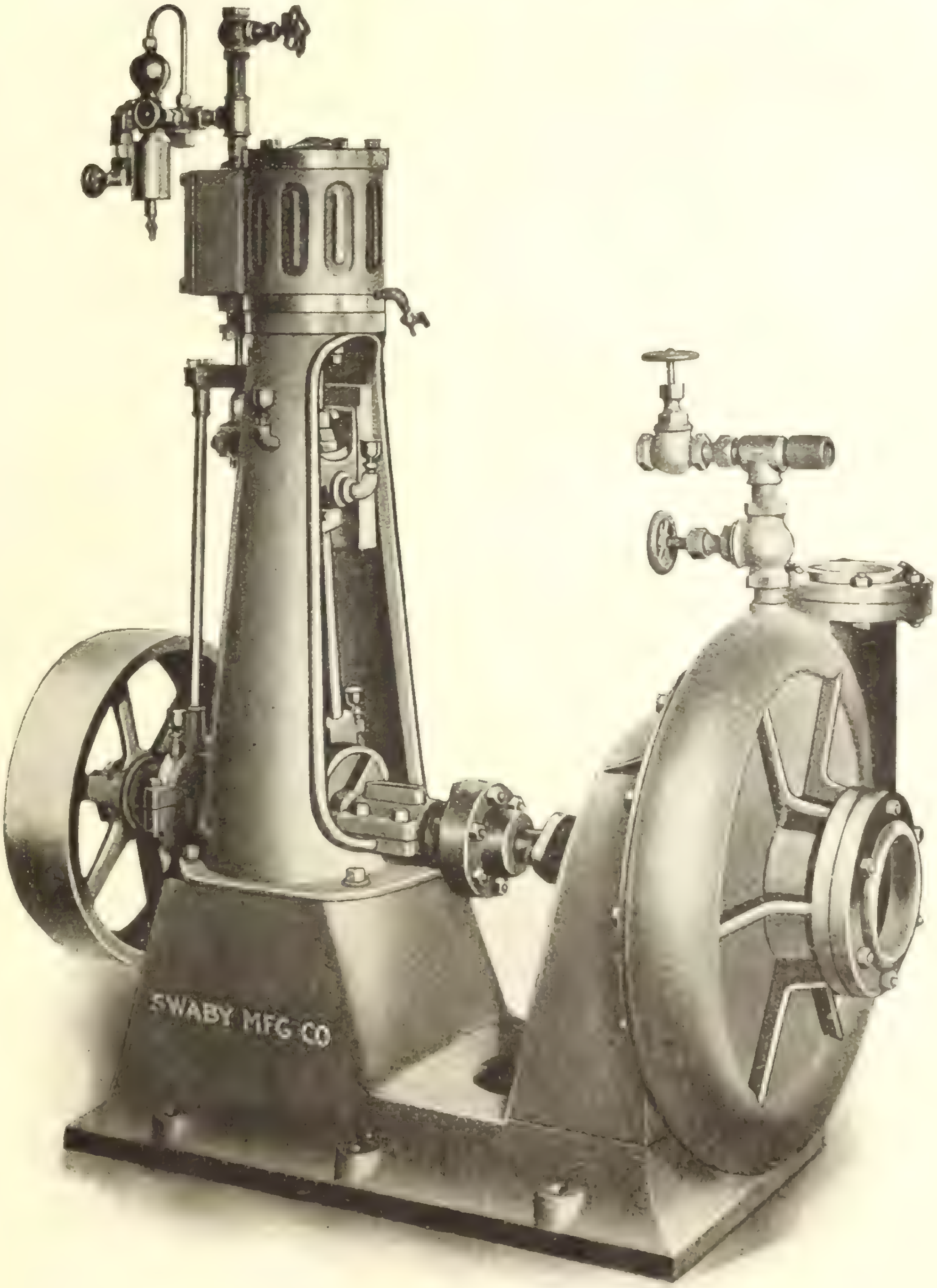

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  Ainsworth, Wm. & Sons
  Buff & Buff Mfg. Co.
  Gurley, W. & L. E.

Filler, Floor and Sewer Joint
    Asphalt
  Canadian Mineral Rubber Co.

Filters
  American Water Softener Co.

Fire Brick
  Improved Equipment Co.
  Smyth & Ryan

Fireproof Doors and Windows
  Metal Shingle & Siding Co.
  Mussens Limited
  Ormsby, A. B.
  Steel & Radiation Ltd.

Fuse (Safety Blasting)
  Lecky & Collis

Forges
  Canadian Buffalo Forge Co.

Furnaces (Special)
  Improved Equipment Co.

Gas and Electric Light Fixtures
  Mitchell Co., Robert.

Gas Plants Complete
  Improved Equipment Co.

Gas Producers for Heating
  Improved Equipment Co.

Gas Machinery
  Improved Equipment Co.

Glass
  Consolidated Glass Co.
  Hamilton Art Glass Co.
  Hobbs Mfg. Co.
  Luxfer Prism Co.
  Toronto Plate Glass Imp't'g Co

Hammer Drills
  Canadian Ingersoll-Rand Co.

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  Canadian Buffalo Forge Co.
  Sheldons Limited
  Jenckes Machine Co.

High Pressure Pipe Lines
  Canadian Boving Co.
  Escher Wyss & Co.

Hoisting Apparatus
  American Hoist & Derrick Co.
  Beatty & Sons, M.
  Browning Engineering Co.
  Canadian Fairbanks-Morse Co.
  Canadian Ingersoll-Rand Co.
  Doty Marine Engine & Boiler Co
  Inglis, John
  Jenckes Machine Co.
  Hopkins & Co., F. H.
  Lecky & Collis
  Marsh & Henthorn
  Mussens Limited
  Royce Limited
  Sturtevant Co. of Can. Ltd., B. F

Hoisting Engines
  Canadian Fairbanks-Morse Co.

Horse Stable Fittings
  Beatty Bros.

Hydrants
  Canada Iron Corporation
  Gartshore-Thomson Pipe Co.
  Kerr Engine Co.

(Continued on page 12)

Don Valley Clay Products

For over twelve years the products of the Don Valley Brick Works have been increasing in variety, quality and popularity. To-day Don Valley Products are regarded as the best in America in every way.

Buildings erected years ago of Don Valley Brick look as clean-cut and fresh to-day as when they were built.

Don Valley Brick has won out in competition with the leading brick manufacturers of the world.

Lumsden Building, Toronto

J. A. McKenzie, Architect. H. N. Dancy & Son, General Contractors.

Don Valley Fireproofing, Bricks and Tile used throughout

Traders Bank, Toronto

Carrere & Hastings and F. S. Baker, Associate Architects.

Don Valley Porous Terra Cotta Fireproofing and 2,000,000 Don Valley Brick used

Porous Terra Cotta Fireproofing

Don Valley extensive clay and shale deposits include a clay particularly well suited to the manufacture of Porous Terra Cotta. This raw material coupled with our modern facilities and experience enable us to burn tough and strong fireproofing.

Don Valley Clay Products are used in most of the important buildings from Halifax to Vancouver.

Royal Bank, Toronto

Eustace G. Bird, associated with Carrere & Hastings, Architects. Norcross Bros., Contractors.

Don Valley Porous Terra Cotta Fireproofing and Bricks used

Bell Telephone Building

Adelaide Street, Toronto

W. J. Carmichael, Architect. [illegible] Contractors.

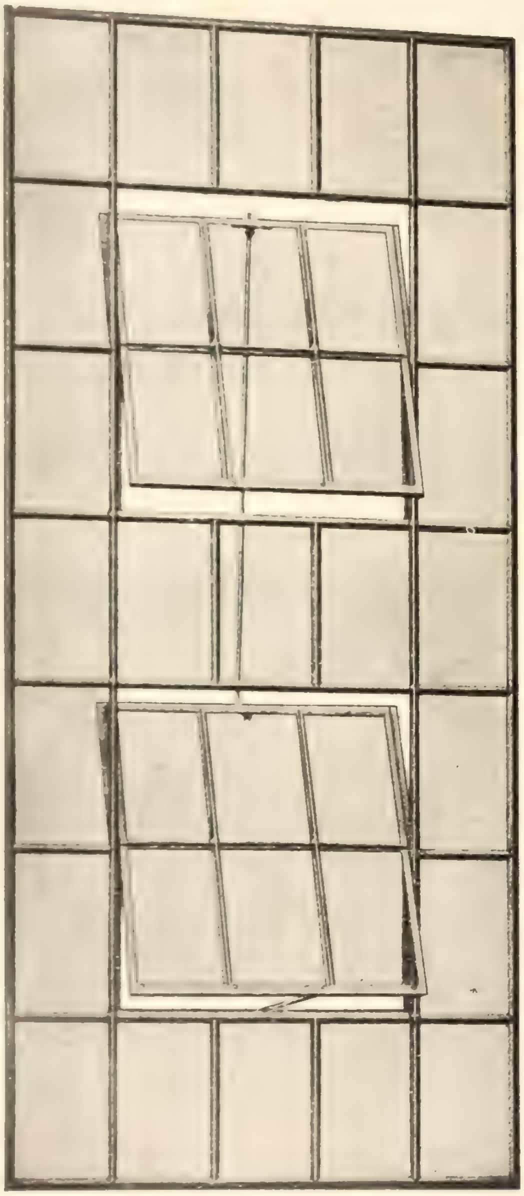
Don Valley Porous Terra Cotta Fireproofing and Bricks used.

Always Specify "Don Valley" Clay Products

Don Valley Brick Works

TORONTO - ONTARIO

LET IN THE LIGHT



"Fenestra"

"Fenestra" TRADE MARK

Solid Steel Sash

will afford

More Light—Better Ventilation

in any building where they are installed. "Fenestra" is a high-grade steel patented joint sash—it takes up minimum space and permits the maximum passage of light through the window.

"Fenestra" Solid Steel Sash requires no frame, sash weights or heavy mullions—the cost is thereby reduced so that the price compares favorably with the price of wooden sash even when the price is higher it is more than compensated for by the enormous advantages gained in

Strength, Durability, Handsome Appearance,

Weather Proofness and Fire-resisting Qualities

Besides that consider the permanence of steel as compared with wood and remember that with "Fenestra" Solid Steel Sash you save all the up-keep costs entailed by wooden sash and frames—in a big building that is a big item.

"Fenestra" Solid Steel Sash

proves itself an economy wherever used but is particularly suitable for

Factories, Foundries, Power-Houses, Prisons,
Railroad Shops, Warehouses, Barracks, etc.

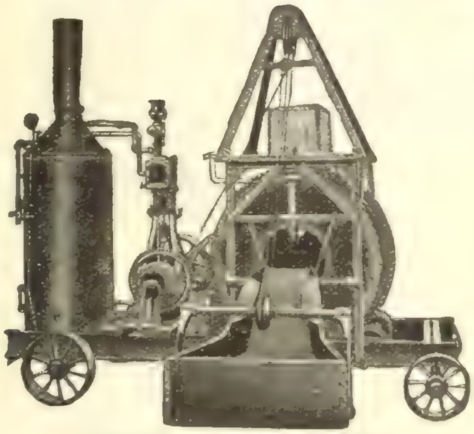
We will help you to settle the problem of your window requirements—write us.

STEEL and RADIATION, Limited

TORONTO, CANADA

London Concrete Mixers

are built in Many Styles and Sizes



London Standard Drum Batch Mixer

The MANY NEW and IMPROVED features of the LONDON MIXERS appeal to the contractor.

London Automatic Batch Mixer No. 2

The Enormous Sale of those machines is sufficient proof as to satisfaction they are giving. Everything made in our own shops.

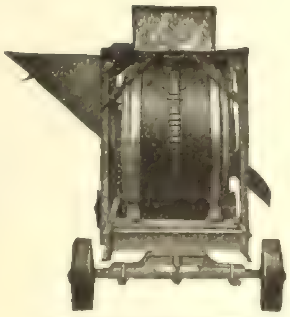
Every machine HIGH GRADE.

Every machine sold under a STRONG GUARANTEE.

London Sill Step and Window Cap Mould

SEND FOR OUR 1912 CATALOGUE which shows our complete line. 160 pages of illustrated matter. It's a dandy

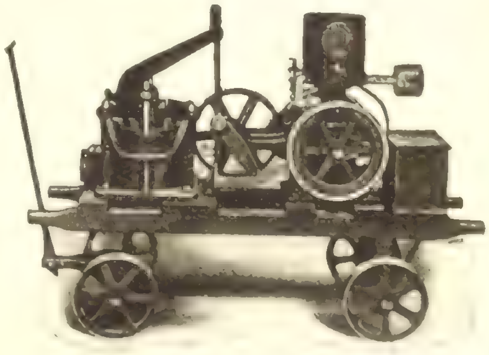
We manufacture a complete line of Concrete Machinery, Cement Working Tools, Hoisting Engines and Contractors' Tools.



London Standard Drum Batch Mixer

WE ARE THE LARGEST MANUFACTURERS OF CONCRETE MACHINERY IN CANADA. That is why we can sell at such remarkably low prices.

Producing in large quantities reduces the cost of production.



Pumping Outfit

London Concrete Machinery Co. Limited

Cabell St. and Kitchener Ave., LONDON, ONT.

BRANCHES:

WINNIPEG, (445 Main St.) W. H. Rosevear, Mgr.
CALGARY, (622 9th Ave. W.) P. D. McLaren, Mgr.
TORONTO (60 Richmond St. W.) F. D. Emsley, Mgr.
HALIFAX, (106 Pleasant St.) G. B. Oland, Mgr.

AGENCIES:

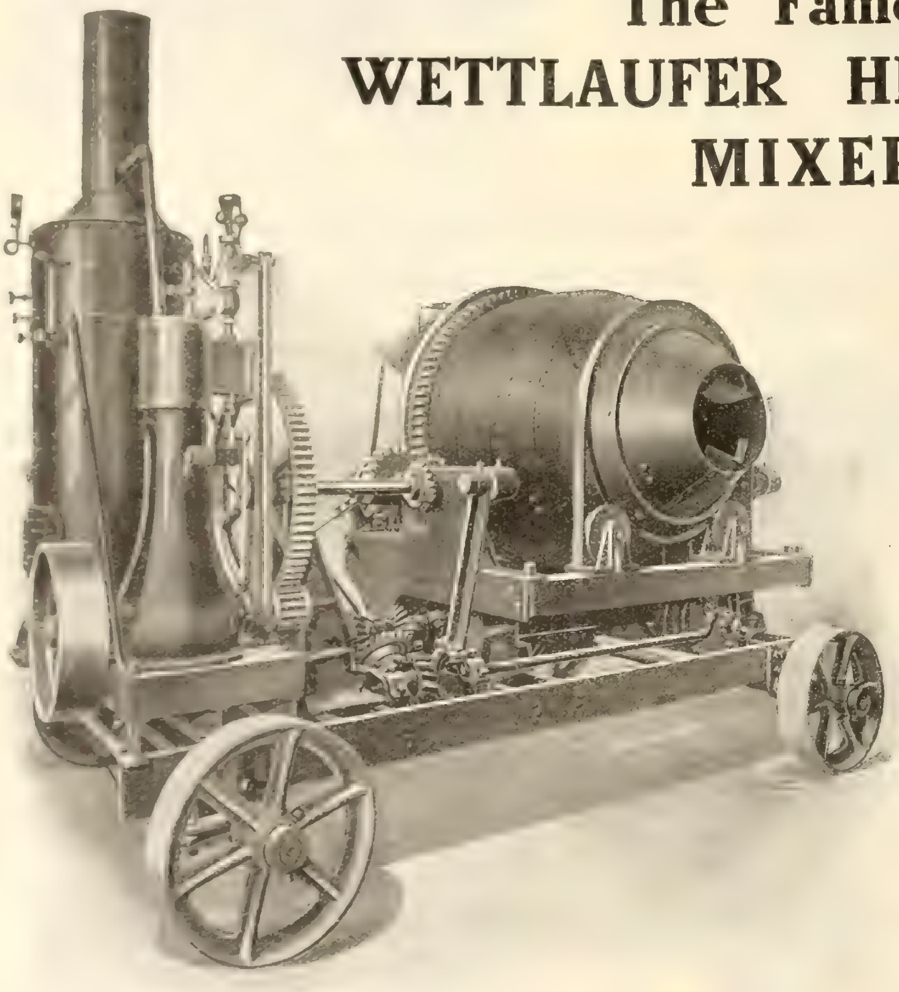
VANCOUVER, B. C. Equipment Co.,
MOOSE JAW, SASK., Bridge & Iron Co., Ltd.
REGINA, H. A. Knight
FORT WILLIAM, Northern Eng. & Supply Co
MONTREAL, Foss & Hill Mach. Co.,
QUEBEC, Rene Talbot

EVENTUALLY

—WHY NOT NOW?

You **must** have a **Good Mixer** some time—You can't go on putting up with a poor makeshift—You will realize some time that you **must** have a mixer that will do the best work, and when you realize that you will naturally turn to

The Famous WETTLAUFER HEARTSHAPE MIXER



This is the mixer that will do **good work** for you **all the time** — the mixer that saves you time and money and increases the efficiency of your equipment.

Strong Construction

Automatic Operation

Low Working Cost

Rapid and Perfect Mixing

Increased Capacity

Minimum Repairs

Full particulars and catalogue on request.
Come and see this mixer working—Continuous demonstrations at

WETTLAUFER BROTHERS

TORONTO, ONTARIO

FACTORIES : **Mitchell, Ont.** **Buffalo, N. Y.** **Detroit, Mich.**

AGENCIES :

A. R. Williams Machinery Co.
15 Dock St., St. John, N. B.

Lavallee Ross, Limited
Alexandra Block, Howard Ave.
Edmonton, Alta.

Hooton & Moore
613 Ashdown Block,
Winnipeg, Man.

MONTREAL OFFICE and WAREROOMS : **316 Lagauchetiere St. W.** **Head Office: TORONTO, Ont., 178 Spadina Ave.**

For Your Next Shipment of Cement, Order

ROGERS

Portland Cement

Throughout the entire manufacture of Rogers Portland Cement every precaution is taken to keep the product at its high standard.

The care exercised in this regard has produced a high grade that is dependably uniform. This dependability is invaluable to many users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the integrity of the manufacturer.

We can supply you with the highest grade cement on the market—our

Well Equipped Mills

are a guarantee of uniform good quality and our

Ample Capacity and Good Storage

enables us when handling orders to take every advantage of railway and water connections—We are

Always Ready to Ship

at the most advantageous time as soon as we receive your order.

Mills at

Kirkfield - Owen Sound - Hanover - Orangeville - St. Mary's

Rogers Crushed Stone

For Sidewalk, Concrete Road and other contracts.

We can furnish crushed stone in all sizes, clean and free from dust, dirt and mould, and evenly graded. We have recently increased our plant to a capacity of 4,000 tons per day, and we can guarantee delivery of any amount up to 4,000 tons per day. This is the best line for road and concrete work—Thousands of tons used locally.

Plants at Dundas and Vinemouth

French Caen Stone Cement

As good as natural stone—but cheaper.—A perfect imitation—Adaptable to all ornamentation or architectural decoration, both interior and exterior.

Quotations made for all Work Prompt Deliveries and Complete Shipments given from Stock

Alfred Rogers Limited

28 King St. West **Toronto, Ontario**

Western Sales Manager

W. J. DINNEN & CO., Winnipeg, Man.

CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

[illegible] Machinery
  [illegible] Refrigeration Co.
[illegible] Compounds
  Canadian Mineral Rubber Co.
  Standard Underground Cable Co. of Canada Limited

[illegible] Finish and Doors
  [illegible] Limited
  Canada Office & School Fur. Co.
  [illegible]
  [illegible] & Co.

[illegible]
  Canadian Buffalo Forge Co.
  [illegible] Limited
  [illegible] Co. of Can. Ltd., B. F.

Lime
  Jamieson Lime Co.
  Ontario Lime Association

Lime Kilns
  Improved Equipment Co.

Locomotives
  Buffalo Pitts Co.
  Canadian Boving Co.
  Montreal Locomotive Works
  Canada Foundry Co.

Marble
  Dominion Marble Co.
  Lautz Company
  Mississquoi Marble Co.

Metal Lath
  Greening Wire Co., B.
  Metallic Roofing Co.
  Noble, C. W.
  Steel & Radiation Ltd.

Metal Forms
  Hotchkiss Lock Metal Form Co.

Meters, Electrical
  Ferranti Electrical Mfg. Co.

Meters, Water
  Hopkins & Co., F. H.
  McDougall Caledonian Iron Wks
  [illegible] Meter Co.

Motor Trucks
  Jones & Glassco

Packing and Pipe Coverings
  Garlock Packing Co.

Paints (Bridge and Structural Iron and Pipe Coating)
  Canadian Mineral Rubber Co.

Paints and Varnishes
  Elaterite Paint Co.
  Goheen Co.
  Pinchin, Johnson & Co.

Paving Cement
  Canadian Mineral Rubber Co.

Paving and Paving Materials
  Dominion Creosoting Company
  Metropolitan Paving Brick Co.
  Ontario Asphalt Block Co.
  Paterson Mfg. Co.

Perforated Metals
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.

Pipe (Concrete, Iron and Wood)
  American Spiral Pipe Works
  Canadian Pipe Co.
  Dominion Concrete Co.
  Dominion Wood Pipe Co.
  Gartshore-Thomson Pipe Co.
  Munderloh & Co.
  National Iron Works
  National Pipe & Foundry Co.
  Pacific Coast Pipe Co.
  Pedlar People Limited.
  Piggott & Co., Thos.

Pile Driving Machinery
  American Hoist & Derrick Co.
  Browning Engineering Co.
  Canadian Ingersoll-Rand Co.
  Lecky & Collis
  Vulcan Iron Works

Planing Mill Exhausters
  Canadian Buffalo Forge Co.
  Sheldons Limited

Plaster
  Alabastine Co.
  Albert Mfg. Co.
  Britnell & Co.
  Crown Gypsum Company

Plug Drillers
  Canadian Ingersoll-Rand Co.

Plumbers' Supplies
  Standard Ideal Co.

Plumbers and Steam Fitters Brass Goods
  Mitchell Company, Robt.

Pneumatic Machinery
  Canadian Ingersoll-Rand Co.

Portable Saws
  Canadian Fairbanks-Morse Co.

Portable Track
  Bechtels Limited

Power Engines
  Inglis Company, John

Pumps and Pumping Machinery
  Bates & Edmonds
  Beatty & Sons, M.
  Canada Foundry Co.
  Canadian Boving Co.
  Canadian Buffalo Forge Co.
  Canadian Fairbanks-Morse Co.
  Canadian Ingersoll-Rand Co.
  Cook, A. D.
  Escher Wyss & Co.
  General Supply Co.
  Hamilton Mfg. Co., Wm.
  Hopkins & Co., F. H.
  Inglis & Co., John
  McDougall Caledonian Iron Wks.
  Smart-Turner Machine Co.
  Waterous Engine Works Co.
  Mussens Limited
  Ontario Wind Eng. & Pump Co.

Quarry Machinery
  Canadian Ingersoll-Rand Co.
  Improved Equipment Co.
  Lecky & Collis
  George Anderson & Co.

Railway Supplies
  Gartshore, John J.
  Hopkins & Co., F. H.
  Mussens Limited

Refrigeration Machinery
  Linde British Refrigeration Co.

Reinforcements, Concrete & Steel
  Ambursen Hydraulic Cons. Co.
  Canada Steel Co., Ltd.
  Canada Wire & Iron Goods Co.
  Greening Wire Co., B.
  Steel Co. of Canada
  Steel & Radiation Ltd.
  Trussed Concrete Steel Co.
  Turner, C. A. P.

Revolving Stone Screens
  Greening Wire Co., B.

Road Asphalt
  Canadian Mineral Rubber Co.

Road Machinery
  Erie Machine Shops
  Lecky & Collis
  Morrison & Co., T. A.
  Mussens Limited
  Waterous Engine Works Co.
  Western Wheeled Scraper Co.

Roofing Material
  Asbestos Mfg. Co.
  Can. H. W. Johns-Manville Co.
  Canadian Mineral Rubber Co.
  Canadian Supply Company
  Metallic Roofing Co.
  Noble, Clarence W.
  Paterson Mfg. Co.

(Continued on page 14)

ACCURATE METERS

Ferranti

Glass Case—Top Connections

In Ferranti meters you have all the good qualities of a perfect meter; absolute accuracy, simple construction, top or bottom connections and perfect workmanship.

We would like to quote you on your meter requirements. Large stocks carried in Toronto and Winnipeg.

Steel Case—Top or Bottom Connections

The Ferranti Electrical Co. of Canada, Limited
TORONTO, 90 Sherbourne St. WINNIPEG, 56 Albert St.

TRADE MARK

Reg.U.S.Pat.Off.

BAY STATE

This is the man that made

BAY STATE

Brick and Cement Coating

famous, and it in turn has made the name **WADSWORTH, HOWLAND & CO., Inc.** known wherever a coating for concrete, stucco, or brick is used.

He's the trade mark not only of the best concrete, stucco or brick coating in the market but of the WHOLE BAY STATE line of dependable paints, varnishes, enamels and stains that stand weather and wear.

Ask your dealer for them. If he cannot supply you write us for booklet M. that tells about the BAY STATE line.

Wadsworth, Howland & Co., Inc.

Paint and Varnish Makers and Lead Corroders

82-84 Washington Street, Boston, Mass.

New York Office, 156 Fifth Ave.

In Building Canals

Excavating Ditches, Reservoirs, Loading Wagons, Building Levees, Embankments, etc., there's an unequaled saving in using the sturdy

Western Elevating Grader

Will move 1000 cubic yards per day. Free from complicated parts. Built strong. No annoying breakdowns. Has made records as to strength and durability. There are many "reasons why" you need the Western Elevating Grader. Our Catalog will tell you.

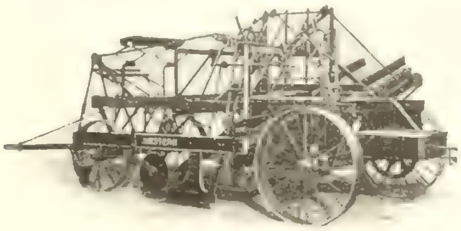
Write today.

Western Wheeled Scraper Co.

Aurora, Illinois

Earth and Stone Handling Machinery

E. P. Jamison & Company, Ltd., Vancouver
Agents for British Columbia



Hagersville Crushed Stone

The Toughest Stone for Macadam in Ontario

Record of Logan Avenue, Toronto, Macadamized from Queen St. to Gerrard St., in 1902

Length 2,454 Lin. Ft. Width 24 Lin. Ft. 6,550 Sq. Yds.

COST FOR REPAIRS				
	1903	$ 0.00	1908	$ 93.26
	1904	3.30	1909	200.46
	1905	9.35	1910	14.07
	1906	37.33	1911	2.29
	1907	16.11		

Total $376.17 or 5⅔c. per sq. yd. for repairs for nine years, a little over 6-10 of 1c. per sq. yd. per year.

Why Not Use Hagersville Stone and Get These Results?

Hagersville Contracting Co.
Hagersville, Ont. Limited

CLASSIFIED INDEX TO ADVERTISEMENTS—Continued

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Goodyear Tire & Rubber Co.

Safes and Vaults
Taylor, J. & J.

Sand and Gravel
Sand and Supplies Ltd.
York Sand and Gravel Co

Screens
Canada Wire & Iron Goods Co.
Greening [illegible] Mfg. Co., B.

Sewer Joint Asphalt
Canadian Mineral Rubber Co.

Sewer Pipe
Britnell & Co
Canada Iron Corporation
Dominion Sewer Pipe Co.
Gartshore Thomson Pipe Co.
National Iron Works
Ontario Sewer Pipe Co.
[illegible] & [illegible]
[illegible] Products Ltd

Sewer Trenching
Lecky & Collis

Sound Deadening
Cabot Inc., Samuel

Shovels (Steam)
Browning Engineering Co.
Beatty & Sons, M.
Canada Foundry Co., F. H.
Hopkins & Co., F. H.
Montreal Locomotive Works
Mussens Limited
Thew Automatic Shovel Co.
Willis Shaw Mach. Co.

Shovels
Lundy Shovel & Tool Co.

Smoke Stacks
Des Moines Bridge Co.
Hamilton Mfg. Co., Wm.

Stains, Shingle, Cement & Brick
Cabot, Inc., Samuel
Pinchin, Johnson & Co.

Steam Apparatus
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F.

Steam Turbines
McDougall Caledonian Iron Wks.

Steel
Canada Steel Co., Ltd.
Dominion Steel Castings Co.
Lecky & Collis
Provincial Steel Co.

Steel Bars
Canada Steel Co., Ltd.
Steel Co. of Canada.
Steel & Radiation, Ltd.

Stone
Britnell & Co.
Brodie, Jas.
Consolidated Stone Co.
Contractors' Supply Co.
Corinthian Stone Co.
Crushed Stone, Limited
Hagerville Contracting Co.
Mahan & Company
McMillan & Son, W.
Morrison & Co., T. A.
Myers, Oakley
Queenstown Quarry Co.
Roman Stone Co.
Sackville Freestone Co.
Sand & Supplies
Smyth & Ryan

Stone Saws
Anderson, Geo.

Structural Iron and Steel
Canada Steel Co.
DesMoines Bridge Co.
Dominion Bridge Co.
Dominion Steel Castings Co.
Hamilton Bridge Works Co.
Mackinnon Holmes & Co.
McNeil & Co., W. P.
Phoenix Bridge & Iron Works
Provincial Steel Company
Reid & Brown
Sarnia Bridge Company
Steel Co. of Canada
Structural Steel Co.
Standard Steel Construction Co

Submarine Drills
Canadian Mineral Rubber Co.
Lecky & Collis

Swinging Gears
Dake Engine Company

Tanks and Stand Pipes
Des Moines Bridge Co.
Hamilton Mfg. Co., Wm.
Inglis, John
Jenckes Machine Co.
Marsh & Henthorn
McDougall Caledonian Iron Wks
Ontario Wind Eng. & Pump Co.
Piggott & Co., Thos.

Tents
Waterous Engine Works Co.

Testing and Inspecting Bureau
Hunt & Co., Robt. W.

Valves
Canada Iron Corporation
Gartshore-Thomson Pipe Co.
Kerr Engine Co.

Ventilating & Heating Apparatus
Canadian Buffalo Forge Co.
Sheldons Limited
Sturtevant Co. of Can. Ltd., B. F.

Vacuum Cleaners
Tuec Company

Varnishes—Insulating
Standard Underground Cable Co. of Canada, Limited

Waterproofing
Cabot Inc., Samuel
Can. H. M. Johns-Manville Co.
Canadian Mineral Rubber Co.
Ceresit Waterproofing Co.
Elaterite Paint Co.
Pinchin, Johnson & Co.

Water Softeners and Filters
American Water Softener

Water Turbines
Canadian Boving Co.
Escher Wyss & Co.
Hamilton Mfg. Co., Wm.
McDougall Caledonian Iron Wks.

Wire
Canada Wire & Cable Co.
Standard Underground Cable Co. of Canada, Limited

Wires and Cables
Royce Limited

Wire Guards and Screens
Canada Wire & Iron Goods Co.
Greening Wire Co., B.

Wire Rope
Canada Wire & Cable Co.
Greening Wire Co., B.
Smith, Thos. & Wm.
Steel Co. of Canada

Wood Turnings
Automatic Wood Box & Turning Company

These High-Grade Asphalts Insure High-Class Results

For 17 years "Pioneer" Asphalts have been specified by Engineers for important projects in which the highest efficiency and the greatest durability were of first consideration. The record of these materials is a record of success.

"Pioneer" **Road Asphalt**—For durable, waterproof, auto-proof macadam roads.

"Pioneer" **Paving Cement**—For reliable, economical Sheet Asphalt Pavements.

"Pioneer" **Filler Asphalt**—For filling the interstices in brick and block pavements. Sanitary—and always stays in place.

"Pioneer" **Road Surface Asphalt**—For building up macadam roads. Lays the dust—only one application a year necessary.

"Pioneer" **Asphalt Mastic Floors**—For manufacturing plants, breweries, canning establishments, ice plants, warehouses, etc.

"Pioneer" Asphalts have a Gilsonite base—99.5 per cent pure bitumen—and in actual service have established their supremaey. Specifications and further particulars on request.

In addition to the above we invite attention to "Pioneer" Mineral Rubber Pipe Coating, "Pioneer" Waterproofing Asphalt, "Pioneer" Sewer Joint Asphalt, "Sterling" Waterproofing Products, Structural Paints, Roof Paints, etc., etc.

THE CANADIAN MINERAL RUBBER CO., Ltd.
Montreal Winnipeg Victoria London, Eng.

Tarvia

Preserves Roads
Prevents Dust~

Rosland Street, Berlin, Ont., Constructed with Tarvia Modern Pavement

Berlin's Experience with Tarvia

The above street in Berlin, Ont., was built in 1912 with a five or six inch base course of broken field stone laid on a well rolled subgrade. The stone was filled with sand and rolled and then three-quarters of a gallon of Tarvia X per square yard was applied. A second or wearing course of stone about 2½ inches in depth was spread on the Tarvia and about 1¼ gallons of Tarvia X was spread over each yard of this stone. Screenings were then added to fill the voids and thoroughly rolled in. A seal coat of approximately ½ gallon per yard was then applied, covered with coarse sharp sand and rolled.

This is the method which the city of Berlin has used in all their construction work for the past three years. The oldest roads of this type are giving excellent satisfaction and in fact, their success is the reason for their steady extension.

A road so constructed is bonded for seven inches of its depth with the densest and most viscid of bitumens. The road will not change its contour for many years and if the surface screenings are occasionally renewed, the maintenance cost of the road will be less than for any other type. The surface is smooth, waterproof, quiet, cleanly and handsome. In fact, the layman finds it difficult to believe that these are macadam roads at all.

The foregoing is the most thorough type of Tarvia work. For surface treatment and dust prevention, there are the lighter grades of Tarvia—Tarvia A and Tarvia B, the cost of which is less and the work of application simpler. Booklets on request.

THE PATERSON MANUFACTURING COMPANY, LIMITED
MONTREAL TORONTO WINNIPEG VANCOUVER

THE CARRITTE-PATERSON MANUFACTURING CO., LIMITED
ST. JOHN, N.B. HALIFAX, N.S.

ALPHABETICAL LIST OF ADVERTISERS

[illegible] .. 85
[illegible] .. 101
[illegible]
[illegible] .. 34
[illegible] W .. 92
[illegible] .. 73
[illegible] .. 88
[illegible] ck Co .. 2
[illegible] Works .. 25
[illegible] .. 100
[illegible] .. 22
[illegible] pany .. 89
[illegible] g Company .. 85
[illegible] Company .. 92
[illegible] .. 88

[illegible]
[illegible] .. 29
Batts Limited ..
Beath & Son, Limited, W. D. .. 30
[illegible] M
[illegible]
[illegible] .. 82
[illegible]
[illegible] .. 33
[illegible] .. 104
[illegible] .. 95
[illegible] .. 94
Browning Engineering Company ..
[illegible] .. 99
Brown Hoisting Machinery Company ..
[illegible] .. 94
[illegible] .. 83
[illegible] .. 77
[illegible]

Cabot, Incorporated, Samuel .. 96
Campbell, R. .. 104
Canada Cement Company .. 3
Canada Foundry Company, Limited .. 75
[illegible] .. 99
[illegible]
[illegible] .. 25
Canada Wire & Cable Company .. 29
Canada Wire & Iron Goods Company .. 87
Canadian Boving Company .. 26
Canadian Bridge Company .. 96
Canadian Buffalo Forge Company .. 106
Canadian Fairbanks-Morse Co., Ltd. .. 107
Canadian H. W. Johns-Manville Co. .. 37
Canadian Kellogg Company .. 37
Canadian Mineral Rubber Company .. 14
Canadian Office School Furniture Co. ..
Canadian Pipe Company, Limited .. 31
Canadian Ingersoll-Rand Company .. 36
Canadian Supply Company ..
Ceresit Waterproofing Company ..
Chain Belt Company .. 79
Chipman & Power .. 104
Clapham & Sons, John .. 89
Conduits Company Limited .. 99
Consolidated Stone Company .. 100
Consolidated Plate Glass Company ..
Consumers Gas Company ..
Contractors' Supply Company, Ltd. .. 94
[illegible] .. 100
[illegible]an Stone Company .. 78
[illegible] .. 22
Crushed Stone Limited .. 87

[illegible] .. 99
Dennis Wire & Iron Works Company .. 77
DesMoines Bridge & Iron Company .. 97
[illegible] .. 104
Dickson Bridge Works ..
[illegible] .. 96
[illegible] .. 76
Dominion Creosoting Company .. 86
Dominion Ornamental Iron Company .. 84
Dominion Marble Company .. 19
[illegible] .. 18
[illegible] .. 24
[illegible] .. 88
[illegible] Works .. 7
Doty Marine Engine & Boiler Co. .. 23
[illegible]

Engineering Works of Canada ..
Erie Machine Shops .. 83
Escher Wyss ..

Farmer, John T. .. 104
Ferguson, H. S. .. 104
Ferranti Electrical Company .. 12
Foundation Company ..
Fuce & Smith .. 104

Galt Engineering Company, John .. 104
Galt Stove & Furniture Company .. 76
Gardner & Saxby .. 104
Gartshore, John J. .. 104
Gartshore-Thompson Pipe & Foundry Co. .. 98
Gandy & Company, L. H. .. 103
Gibbs & Canning ..
Goheen Manufacturing Company ..
Goodyear Tire & Rubber Co. of Canada, Ltd. 35
Greening Wire Company, Limited, B. .. 85
Gurley, W. & L. .. 89

Hagersville Contracting Company .. 13
Hancock, Jr., H. Syd. .. 104
Hamilton Art Glass Co., Ltd. .. 89
Hamilton Bridge Company ..
Hamilton Mfg. Company, Wm. .. 19
Hamilton Pressed Brick Company ..
Harvey, J. .. 102
Heinicke Company, H. R. .. 18
Hepburn, John T. .. 32
Hobbs Manufacturing Company ..
Hopkins & Company, F. H. .. 108
Hunt & Company, Robert W. .. 104

Improved Equipment Company .. 90
Imperial Wire & Cable Company .. 107
Inglis Company, John .. 31
International Marine Signal Co. .. 77-88

Jamieson Lime Company ..
Jenckes Machine Company .. 2
Jennings & Ross ..
Jones & Glassco ..

Kennedy, James C. .. 104
Kerr Engine Company, Limited .. 105
Koehring Machine Company .. 103

Laurentian Granite Company .. 104
Laurie & Lamb .. 1
Lautz Company ..
Lea, R. S. .. 104
Lecky & Collis .. 17
Leonard & Sons, E. .. 87
Linde British Refrigeration Company ..
London Concrete Machinery Company .. 9
Lundy Shovel & Tool Company .. 91
Luxfer Prism Company .. 101

MacLean Daily Reports ..
Mahan & Company ..
Mannesmann Tube Company .. 82
Marsh & Henthorn, Limited .. 76
McDowall, R. .. 104
McKinnon Holmes & Company ..
McMillan & Sons, W. ..
McNeil & Company, William P. .. 98
Meadows, George B. .. 37
Metal Shingle & Siding Company .. 91
Metallic Roofing Company .. 77
Miller & Company, Geo. M. .. 102
Missisquoi Marble Co., Ltd. .. 88
Montreal Locomotive Works Limited .. 87
Montreal Real Estate Show ..
Morrison & Company .. 104
Mussens Limited .. 4
Myers, Oakley .. 87

Napanee Iron Works .. 17
National Bridge Company of Canada .. 97
National Iron Works Limited .. 99
National Pipe & Foundry Company .. 98
Neptune Meter Company .. 97
Nelsonville Brick Company ..
Noble, Clarence W. .. 21
Northwestern Terra Cotta Company .. 90
Nova Scotia Clay Works .. 90

Ontario Asphalt Block Co., Ltd. .. 92
Ontario Lime Company, Limited .. 74
Ontario Sewer Pipe Company .. 18
Ontario Wind Engine & Pump Co. .. 87
Ormsby Limited, A. B. .. 20
Oshkosh Manufacturing Company .. 29
Owen Sound Iron Works .. 26

Pacific Coast Pipe Company .. 1
Paterson Manufacturing Company .. 15
Pedlar People .. 93
Phoenix Bridge Company .. 90
Piggott & Company, Thomas .. 84
Pinchin Johnson & Company .. 106
Power & Son .. 102
Provincial Steel Company .. 24

Queenstown Quarry Company .. 99

Reid & Brown .. 104
Rhodes Curry Company, Limited .. 95
Richardson, J. E. ..
R. I. W. Damp Resisting Paint Co. .. 33
Rogers, Limited, Alfred .. 11
Rogers Supply Company .. 37
Roman Stone Company .. 28
Royce Limited ..

Sackville Freestone Company, Limited .. 21
Sand & Supplies Limited .. 98
Sarnia Bridge Company, Limited .. 97
Sheldons Limited .. 20
Sheppard, James ..
Silcox, A. B. .. 83
Slack & Company, T. .. 104
Smart-Turner Machine Company .. 1
Smith Limited, Thos. & Wm. ..
Smyth & Ryan .. 90
Standard Clay Products Limited .. 80
Standard Ideal Company .. 38
Standard Steel Construction Co. .. 97
Standard Underground Cable Co. of Canada
Stanley Company, W. F. ..
Star Expansion Bolt Company .. 19
Steel Company of Canada .. 24
Steel & Radiation .. 8
Stinson-Reeb Builders' Supply Co. .. 38
Structural Steel Company .. 96
Sturtevant Co. of Canada, Ltd., B. F. .. 25

Taylor, J. & J. .. 77
Thew-Automatic Shovel Company .. 23
Tiffin Wagon Company .. 81
Toledo Wheelbarrow Company .. 84
Toronto Plate Glass Importing Co. .. 1-90
Toronto Iron Works .. 92
Troy Wagon Company ..
Trussed Concrete Steel Company .. 94
Tuec Company .. 74
Turner, C. A. P. .. 101

United States Steel Products Co. .. 27
United Typewriter ..
Ursche-Bates Valve Bag Company ..

Wadsworth Howland Co. .. 13
Waterous Engine Works Company .. 83
Weeks, Arthur L. .. 104
Welch & Company, H. J. .. 104
Western Canada Contractor .. 94
Western Wheeled Scraper Company .. 13
Wettlaufer Bros. .. 10
Woodstock Wind Motor Company .. 80
Wooliscroft & Son, G. ..

York Sand & Gravel Company .. 94

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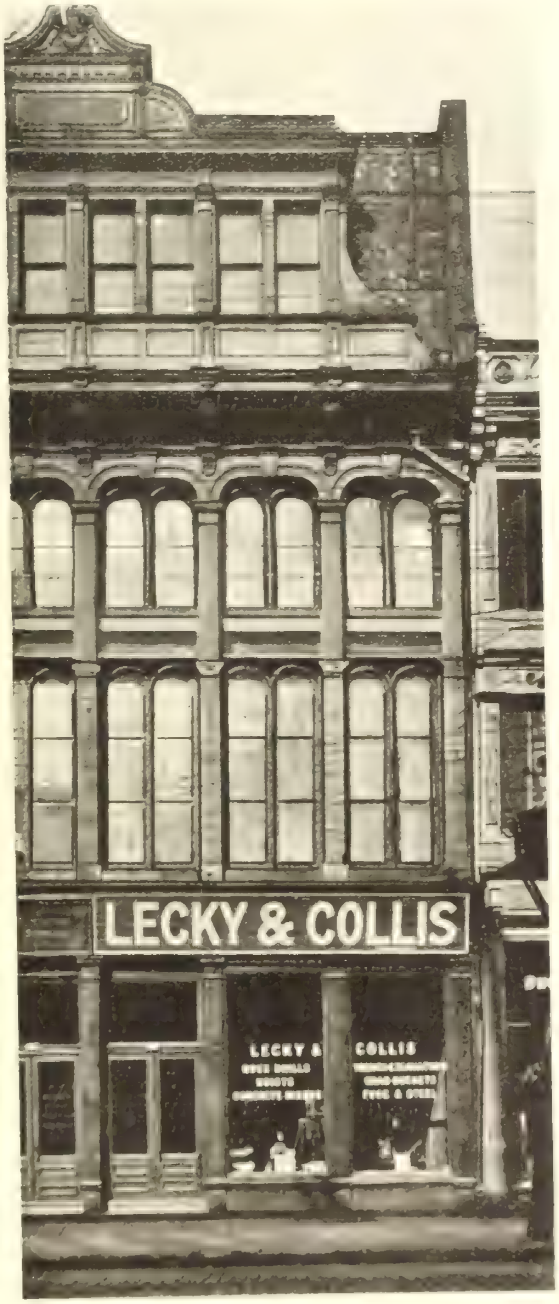

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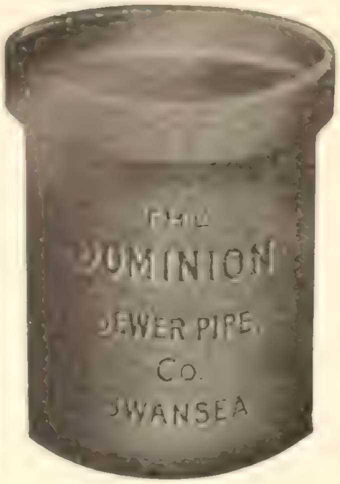

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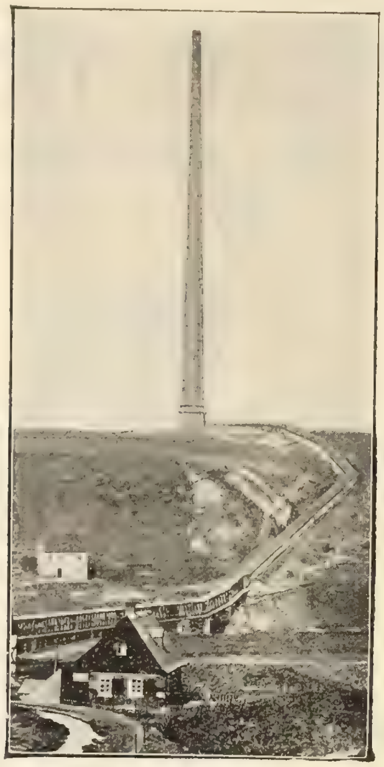

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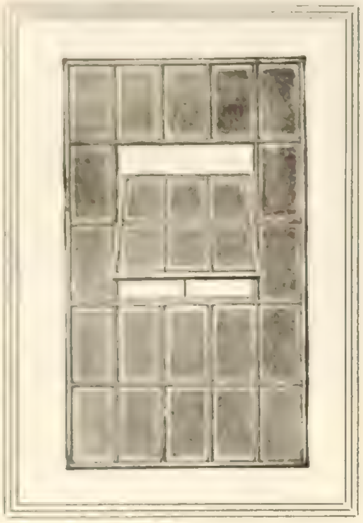

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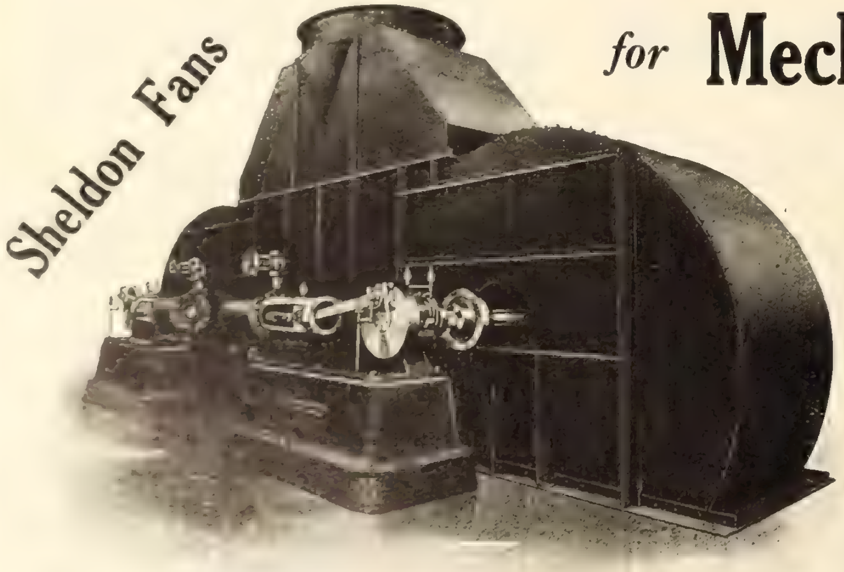

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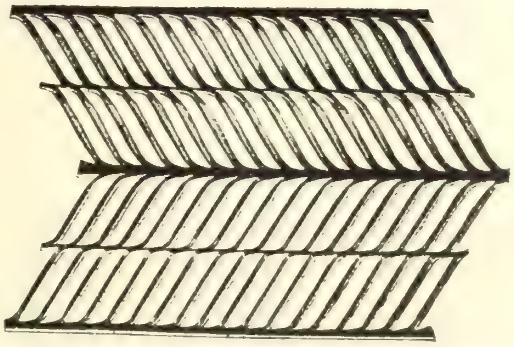

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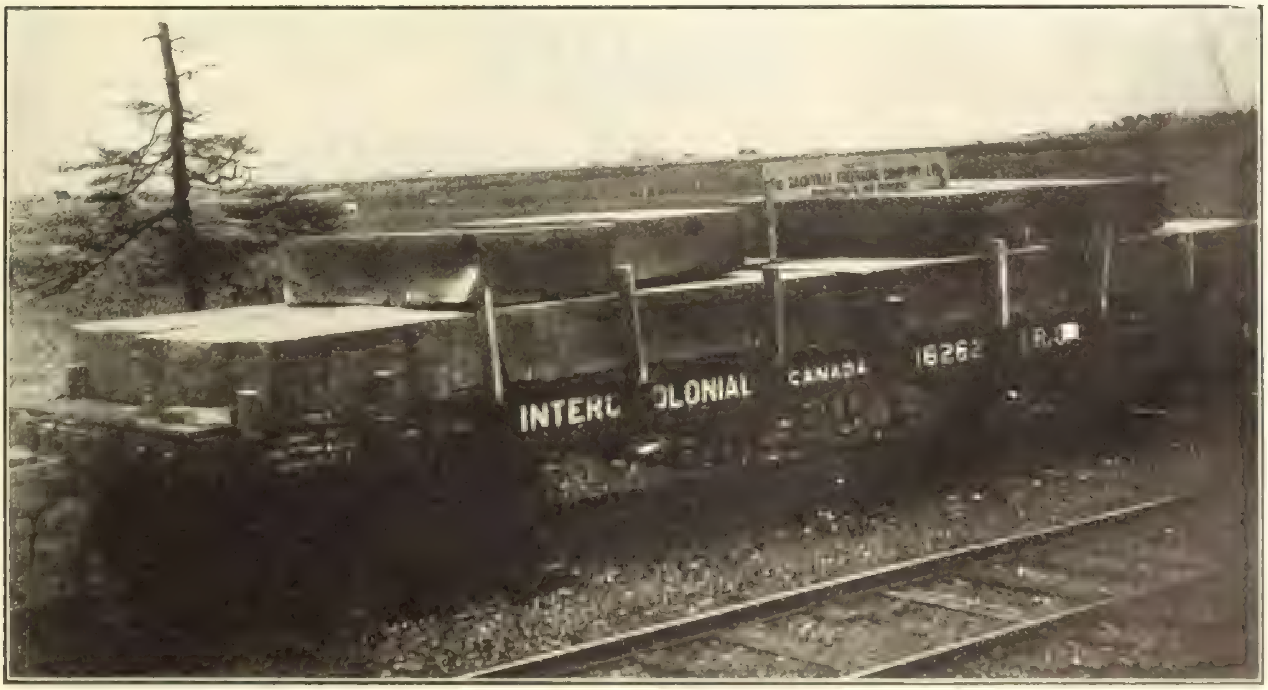

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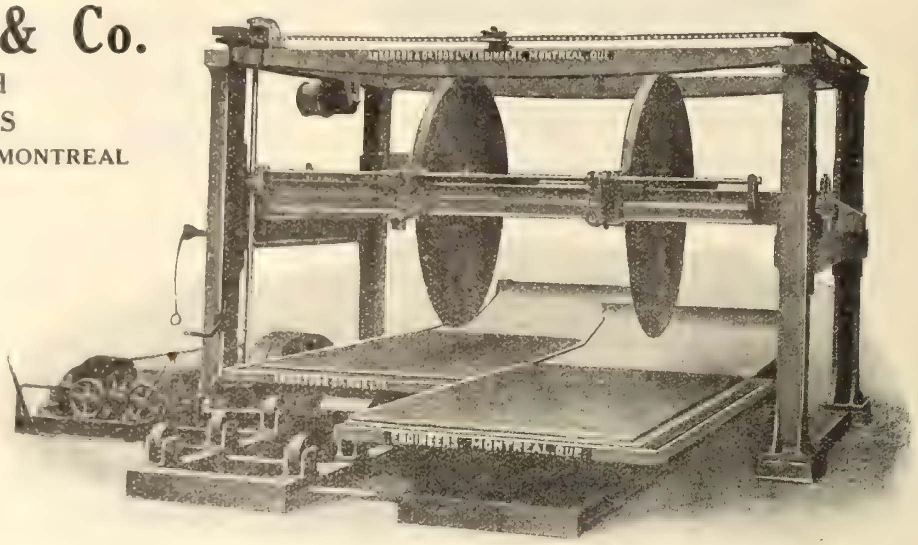

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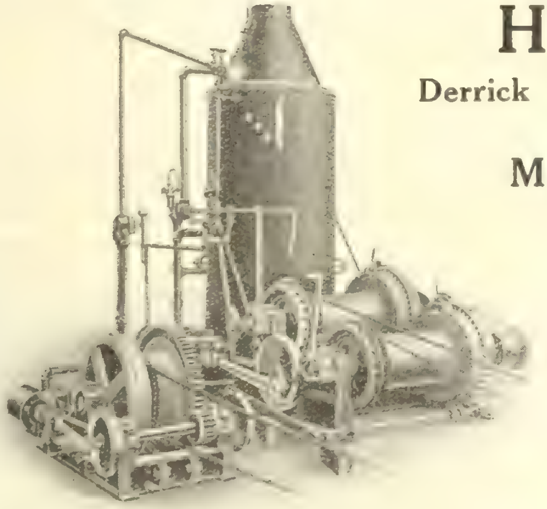

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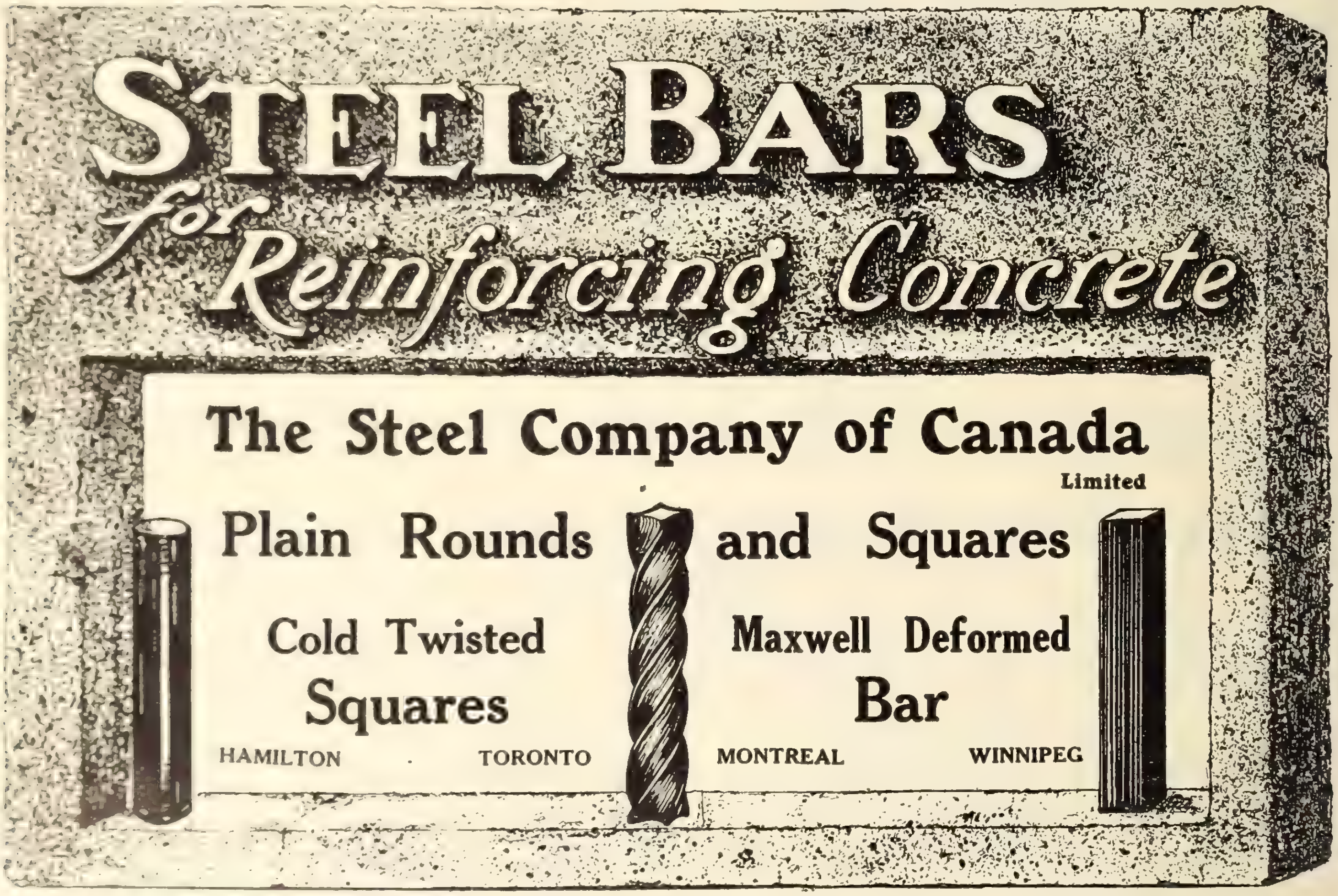

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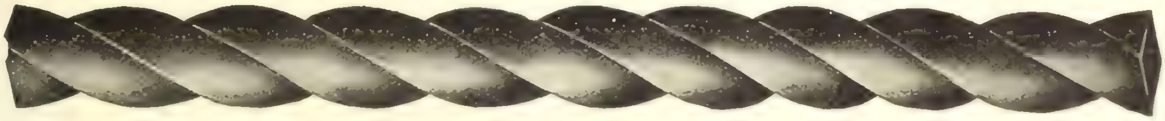

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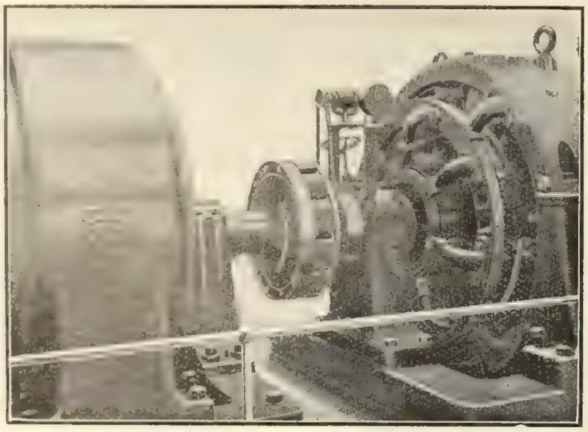

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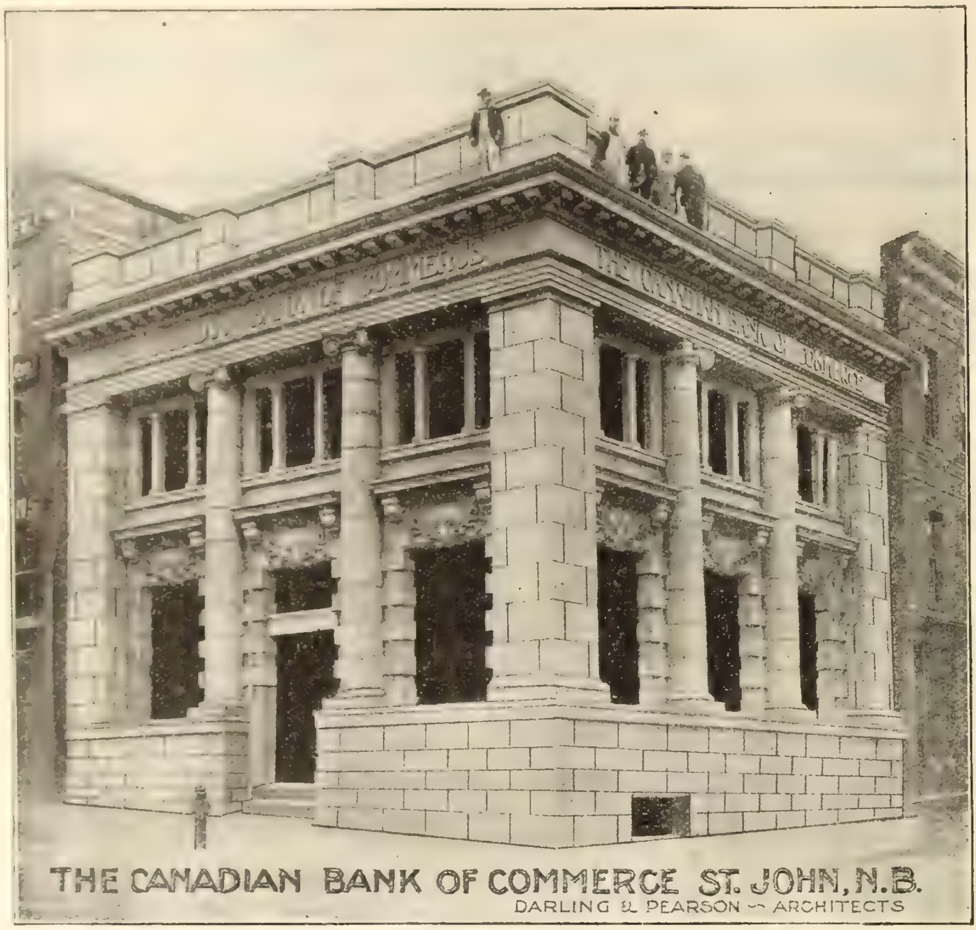

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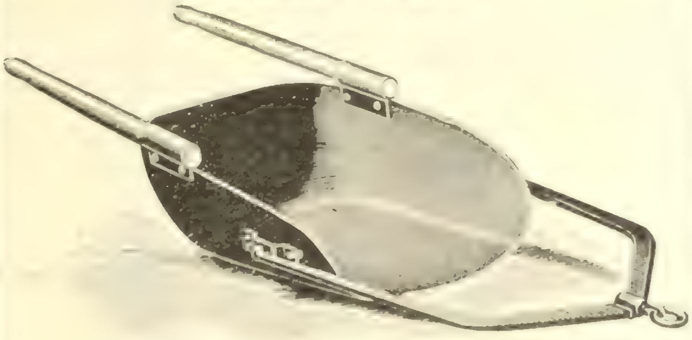

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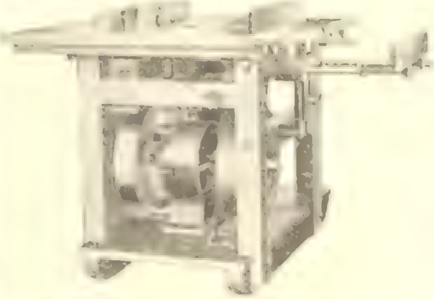

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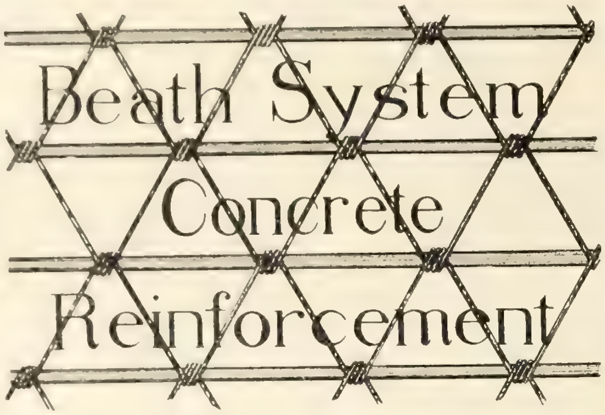

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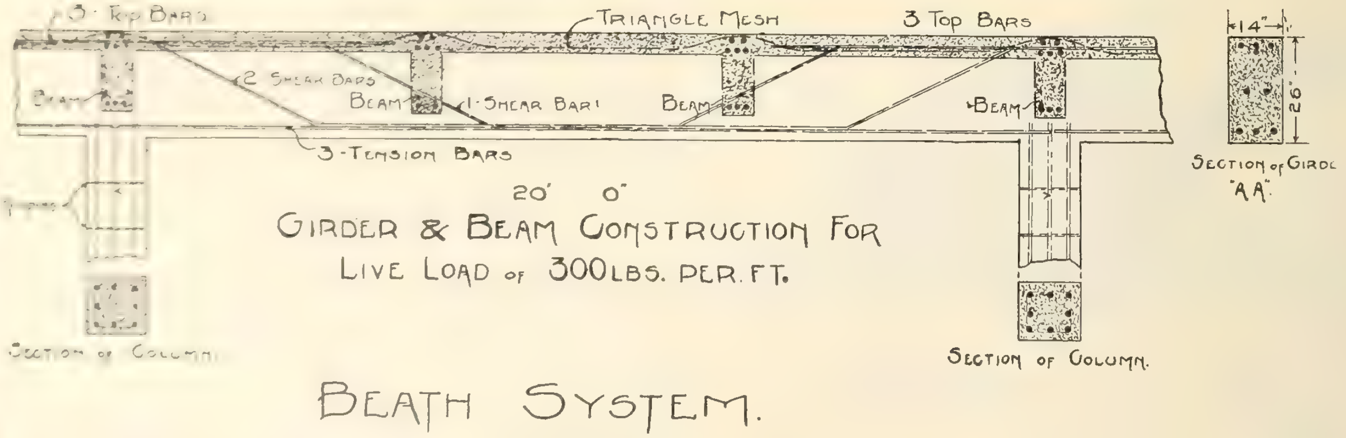

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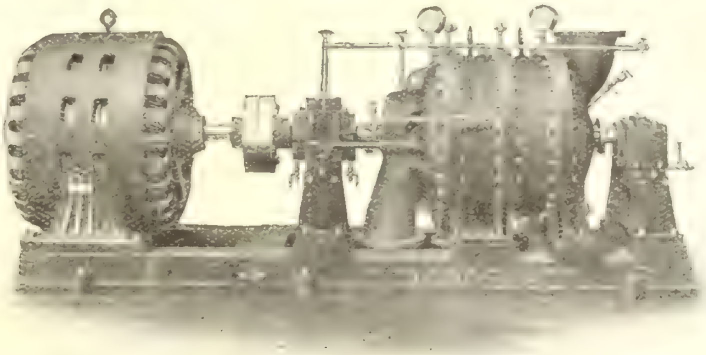

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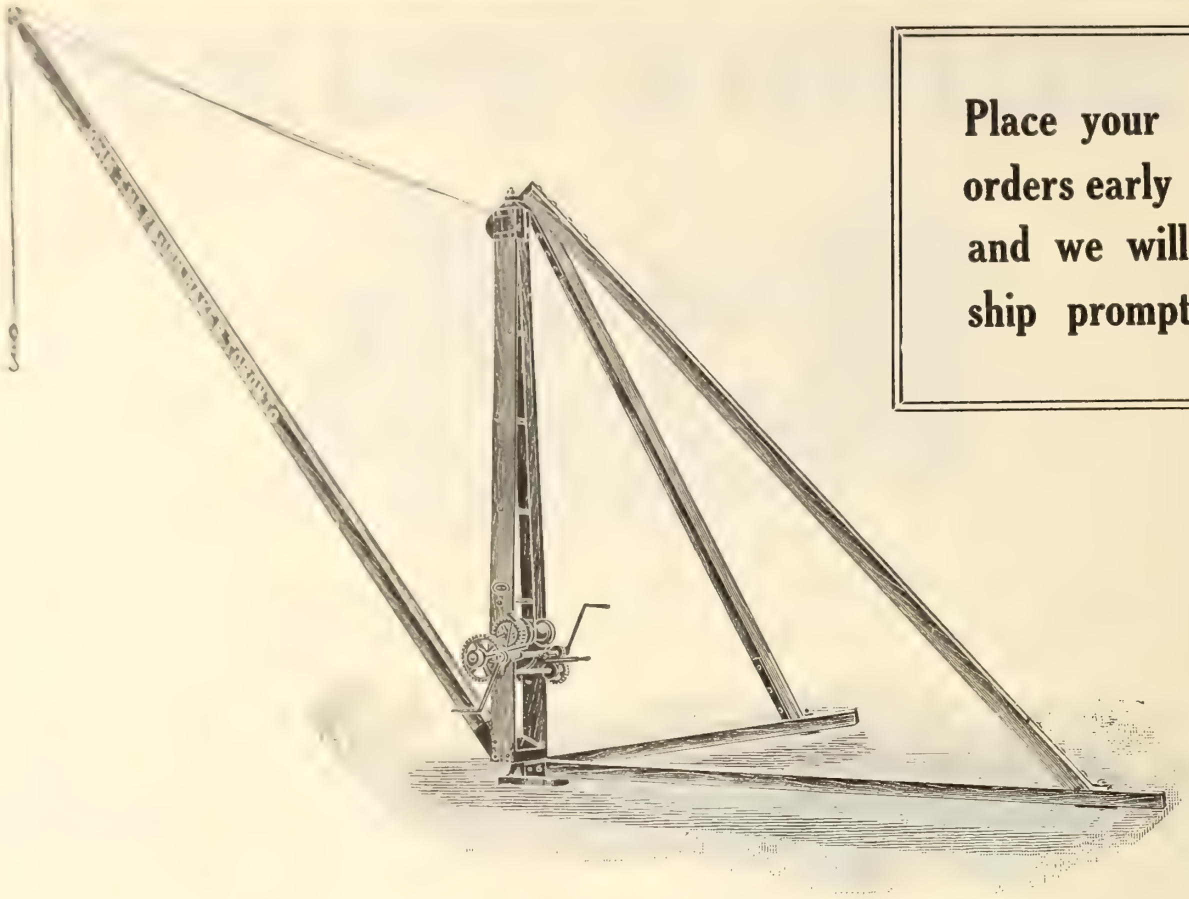

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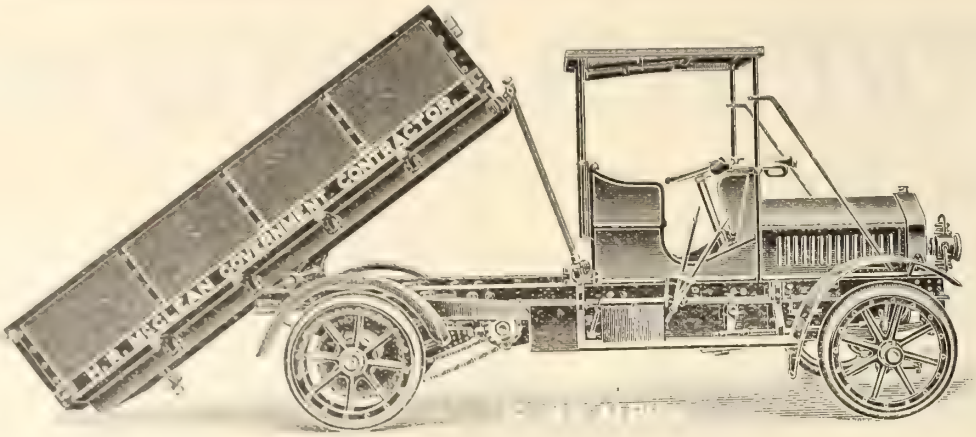
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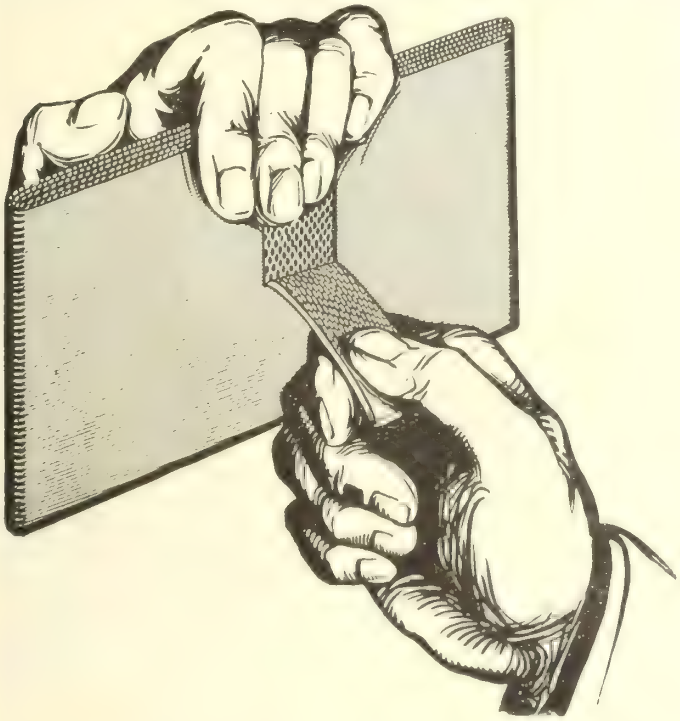

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Make a cut in the top layer—and then try to pull it apart. You will get a faint idea of its strength.

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Total cost for 5 yrs....	[illegible]	$2,800	[illegible]
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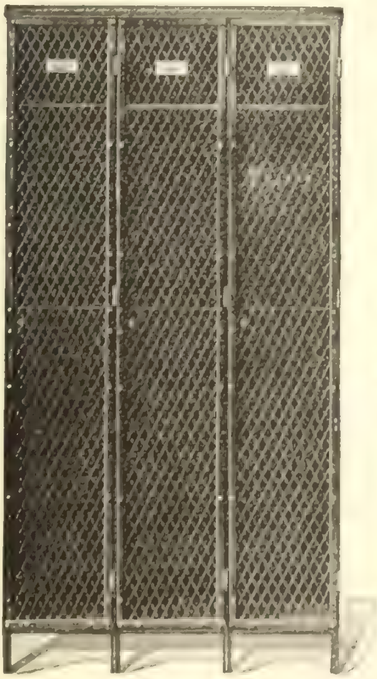

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SUBSCRIPTION RATES
Canada and Great Britain, $2.00. U. S. and Foreign, $2.50
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Alphabetical Index of Advertisers
Page 16

Vol. 28 March 26, 1913 No. 13

Suppression of Technical News

AN unintentional check to the progress of sound engineering and economical construction is given almost continually by many engineers in responsible charge of large works, comments The Engineering Record in an editorial with which we are heartily in accord. Attention is called to the matter now, before the opening of the active construction season, in the hope that reflection may show these engineers the error of their views. For various reasons they adopt the policy of permitting nothing to be said regarding the work under their control until it is completed, while, on the other hand, about all the technical articles they read during the construction season relate to the progress on other works in which they have some interest. The study of an article on the computation of stresses or one discussing the results of a series of tests of engineering materials never enters their heads at such a time. What they wish is technical news, and if they do not get it they tell their journalistic acquaintances not to give their publications such an appearance of owlish gloom. But they never consider that if everybody adopted the policy of suppression of news live technical journals could not be published.

The suppression of so much good engineering information until it becomes too old to be of much interest is due to a very common misapprehension as to what constitutes technical news. It is whatever is of interest on account of its timeliness or novelty. The monthly report of the progress of work on the Panama Canal is technical news when it is issued, but of little value a few months later. A statement regarding a threatened washout of a cofferdam and of the means taken to face the danger is also news of wide interest, whereas a general description of the plant when it is finished, without an account of this flood and of other unusual though minor incidents, may be little more interesting than a parish register. Under the anti-publicity regulation the story of the flood never gets into print, but the less useful and usually somewhat dull description of the plant is published when the latter has been put in service. This is undesirable because those features of the undertaking which are likely to be of most use to the largest number of engineers are not connected with the general arrangement of the works, but rather are the unusual details of design to meet special conditions or the novel expedients adopted during construction.

Most of the progress in civil engineering to-day is due to the adoption of little forward steps here and there. Startling novelties are very few and consequently these small advances are the things which afford the news engineers welcome. They all tell about these details to visitors, and no secret is made of them until it comes to publishing the information. Then the chances are more than ever that the helpful little contribution to general engineering knowledge is suppressed. There is usually not the slightest reason for such a policy, even when it is undesirable for good reasons to give out information concerning the state of the undertaking as a whole, because the interesting feature can often be described by itself, without reference to the place of its origin. These short articles, moreover, not only have a real news value but, by being indexed individually, become permanently available for reference instead of being buried in a long description of some large undertaking.

It is probable that most engineers who suppress information until the work is entirely completed really have no objection to the publication of new details or methods; it is merely easier for them to make a general rule that nothing whatever shall be given out for publication than to say that nothing shall be given out until it has had their approval. There are often good grounds for this policy, but it should be modified to permit descriptions to be sent out, after approval by the chief engineer, of those new details or methods which can be prepared without referring to the undertaking as a whole.

The aversion to the publication of short articles on the progress of important undertakings sometimes works to the disadvantage of those in charge. The most misleading reports are circulated regarding the condition of the work, and after these accounts have been written by reporters and repeated by other engineers those concerned are made to look like pretty poor men. The very purpose of the suppression of news, the avoidance of anything likely to cause apprehension among those furnishing the money for the work, is very rarely achieved, and in many cases a directly opposite result follows the rigid application of a policy of silence. As a matter of fact, every engineer knows that the publication of the class of information about his own work which he likes to obtain about that of his friends elsewhere will cause no trouble. Many of his friends are already giving out such information to the responsible technical journals, and this is a good year for him to adopt the same policy. If the old-fashioned secretiveness were really complete, if he did not tell everything to any engineer who called on him, if he did not give blueprints and photographs to anyone likely to find them useful, he might have some excuse for shunning print, but in view of the information he already extends to a few so willingly, he ought to extend it to the thousands who, like himself, subscribe for the technical journals in order to get just such news.

The Outlook in the Contracting Field

While financial conditions, lately, have not been all that could have been desired, activity in general business remains satisfactory. In some quarters the financial institutions are blamed for the present monetary stringency. One of the reasons given by them for the policy which they are now pursuing is a lack of confidence arising out of the Balkan war. Another reason is that the grain crop of last year has not yet been realized and that the returns were disappointing. With the immense amount of constructional work now on paper awaiting the necessary funds, it is hoped and generally believed that the present situation will be speedily relieved by the adoption of a less stringent attitude on the part of the bank and loan companies, made possible by a more plentiful supply of money in the agricultural districts. Every other circumstance is favorable to another year of record activity and prosperity.

There have been no appreciable changes in the market situation. Increasing activity is reported from the iron and steel markets. It is significant that during last month—usually an exceptionally dull month—there was much buying by manufacturers, paying special attention to railroad supplies, and from the railroads themselves. Railroad business is increasing by leaps and bounds and the recent purchases of equipment by the leading lines far exceed anything in recent years.

It is hardly necessary to say that there is an increasing demand for brick, judging from the reports which reach us from many quarters. Following the article relating to the brick situation published in our issue of March 12 and as a further exemplification of the conflicting statements of the manufacturers and contractors, we reproduce below (1) a letter received from the National Brick Company of Laprairie, Limited, Montreal, and (2) a report from our Ottawa correspondent.

The Brick Situation From the Standpoint of a Montreal Manufacturer

Editor Contract Record:

We do not anticipate that we shall have any difficulty in supplying the demand here. Owing to improvements that we have made at our works, our output this year will be increased by at least 35,000,000 brick. We may say that we have been able to operate our plants all the winter, and have thereby increased our stock on hand at this season by over 100 per cent. more than in previous years. We feel confident that with this enormous stock on hand and the large increase in our make for the coming year, we shall be able to meet all demands that are made upon us.

As far as Montreal and Toronto are concerned, we believe that manufacturing facilities are improving proportionately to the increase in building. The interests of The National Brick Company of Laprairie, Limited, are largely identified with The Ontario National Brick Company, Limited, which is now constructing a plant at Cooksville, Ont., to supply the Toronto market. This plant will have a capacity of from 80,000,000 to 90,000,000 brick a year, and will commence operating early in May. This, no doubt, will also take care of the abnormal demand in Toronto. It is the policy of both these companies to increase their output proportionately to the increasing demand.

In view of these facts we do not see the advisability of lowering the tariff on brick, whereby a loss would be caused to the invested interests in Canada.

Yours very truly,
The National Brick Company of Laprairie, Ltd.

The Brick Situation in Ottawa

(Correspondence of the Contract Record)

Those persons interested in building operations where the use of brick is required are calculating upon whether the supply will equal the demand during the coming season. Opinions on the question are very much divided. Some contractors who have given much thought to the situation consider that the scarcity of brick in Ottawa may be felt very acutely before the season has finished. Their reason for this is that the open winter has used up a large supply of brick which otherwise would have been carried forward to supplement the supply for the coming season. Other contractors and building supply merchants who were approached on the subject seem to think that the supply will be ample to meet all demands.

Very few of the contractors realise the amount of building construction work which will be gone ahead with in the spring. The Government, city and private corporations this year will require a record amount of bricks.

During the year, the Government will commence four large structures; the New Departmental Block, Post Office, Geodic Survey Building and Customs House. The last-named building has all the excavating work completed. These four structures will aggregate in cost something like seven million dollars. Private corporations will be equally busy. On one of the main streets alone they have in view the construction of business blocks and offices (ranging from the five-storey to the ten-storey building) to the value of over a million dollars. In various architect's offices plans are being prepared for almost seven hundred thousand dollars' worth of apartment houses.

All the above-mentioned structures will require large supplies of brick, to say nothing of the residential buildings contemplated and which are almost too numerous to aggregate.

In summing up the brick situation in Ottawa it may be said that the seven companies manufacturing brick in the city will be hard pressed to supply the demand; that is, if sixty per cent. of the contemplated buildings materialize. It is almost safe to say that most of the brick manufactured at Almonte and Arnprior will be brought to the city and if this source of supply fails what then? The answer will be "Brick from the U.S."

* *

There have been no astonishing developments in the cement market, although the opening of the present season finds the manufacturers in much better shape to take care of the demands of the trade than they were a year ago. A leading firm of general contractors at Montreal in a recent communication expressed confidence in the ability of the manufacturers to cope with the increased demand and stated that they had never experienced any trouble from shortage of cement except at such times when the supply of cars was entirely inadequate. This field will be an interesting one to watch, but whether or no the Canadian manufacturers are equal to the demands forthcoming, it is certain that the Canadian product is equal to the best of imported cements, having fulfilled the requirements of exacting specifications on most of the large work.

Business in structural materials has lately been more active.

Generally, labor seems to be pretty well satisfied with present conditions—not that the attitude of the labor unions is less aggressive than usual but that it is less probable that there will be any widespread labor agitations during the coming season. In most lines the supply of labor is much greater. This fact in itself removes a part of the incentive to make trouble on the part of the unions. It would be regrettable indeed if any complication were to arise at a time when it would have a most unfavorable bearing upon the financial aspect.

The Present Status of the Engineer

IN view of the discussion concerning the work and status of the Canadian Society of Civil Engineers that crops up once more in this issue, it is of interest to note a contribution to a recent issue of The Engineering News, of which the following is an abstract. The observations relate to a number of phases of the Canadian discussion and, of course, the general principles are applicable. Mr. E. H. Cowan, engineer and contractor, of Taylorville, Ill., is the correspondent.

For years there have been read, at the various engineering society meetings, thoughtful papers on such subjects as "Compensation for Engineers," "A Recommended Scale of Prices for Engineering Services," "Why are Engineers So Poorly Compensated." Many questions of professional ethics have been discussed and various committees have been appointed to frame codes. Attempts have been made to secure legislation restricting the practice of engineering to those who have been found qualified by some board, but in only a few instances have such attempts been rewarded with any great measure of success. All these efforts are praiseworthy, but it is difficult to see how they have improved the status of any considerable body of engineers, either as to their compensation, the dignity of their calling, or their professional, business or social relations. Committees may fix scales of prices for engineering services, but only those who are in private professional practice are interested in them.

Committees have resolved that salaries paid to engineers are too small and that they should demand more for their services. This interests another class of engineers, which includes many grades, and these, except perhaps in the higher salaried positions, are the ones who, if they were as earnestly striving to advance their own interests as most classes of poeple are at the present day, would get together and form associations, similar to labor unions, and demand better pay. They are prevented by a false sense of the dignity of a profession to which the majority can hardly be said to belong, as will be more fully set forth below.

Likewise, several codes of ethics have been carefully worked out and submitted to the more or less interested members of local and national organizations and to the fraternity as a whole. They are all good and will have a general good effect. Unfortunately such codes adopted by engineering societies so far have only been in the nature of recommended practice. There has been no attempt to enforce any of their provisions, as is done in the case of lawyers, the doctors and the ministers. The only punishment that can well be inflicted is expulsion from some more or less restricted organization, and so far that has not been attempted, it is believed.

The expulsion of a member of even one of the great national engineering organizations would not have the effect of practically putting a man out of practice, as is the case in the legal, medical and clerical professions. Indeed in a great many cases it might not injure an engineer at all in the eyes of his clients.

If, for instance, the American Society of Civil Engineers, with headquarters in New York, most of its meetings held in that city, and with the majority of its rigidly selected membership residing in that vicinity, should discipline a member residing in Kalamazoo, Mich., who is popular with his clients, it might be a question which would suffer most in local prestige—the Society or the member from Kalamazoo. All this is not meant to discourage the adoption of codes of ethics, but to point out their limitations.

It is hard to induce legislators to pass laws restricting the practice of engineering. Many of them condemn such laws as prohibiting free opportunity, and therefore contrary to the American spirit. They may have had very little contact or acquaintance with engineers, and consider that if a man wants line and grade stakes set for a new building, or a system of farm drain tile laid out, he should be privileged to employ John Jones who, he knows, has never had a technical-school education, but who has been performing such services satisfactorily for his neighbors. Other legislators think they see an attempt at monopoly, of benefit only to those who are pressing for the legislation. And, moreover, any such legislation must have its inequalities and injustices, even though very careful provisions are made toward avoiding them.

However, it would seem that in legislation lies the only hope for placing the profession of engineering upon its proper plane, and establishing it in the eyes of the people upon a level with the other learned professions. But we need to get down to basic conditions, and see things if possible from an outside viewpoint. It is best to go afield of engineering, for the point of view of the average engineer is sometimes thought to be not very broad, for the reason that his training and habits of thought are along mathematical lines.

Let us examine briefly conditions inside the three leading professions, so called.

The Leading Professions

Of these **the medical group** is perhaps the most thoroughly educated and its standing in the community, as a profession in the best sense of the word, is perhaps the highest. Nearly all doctors are good citizens and are looked up to as leaders in the community. They have a well recognized and admirable code of ethics.

The clergy have all degrees of education, from the highest to nearly the lowest, depending largely upon the requirements of the different denominations and locations. But, as a rule, the poorly educated clergyman finds himself so placed as to be as efficient among the people he serves as is the more educated one in his place. Owing to the nature of their calling these men are almost universally respected—although many of them have little part in the life of the community, at least beyond that portion of it which attends their own church. The layman, perhaps, observes no strong system of professional ethics among the churchmen, as they are naturally governed by the high system of ethics and morals which they are trying to impress upon the world at large. But we all can recall cases of effective discipline, both formal and informal, following conduct inconsistent with this high calling.

The legal profession is suffering from lack of education in many of its members, and the low standards of admission to the bar in many states, together with too much pernicious political activity, and other causes. Consequently, as a whole, this profession is not in as good repute as the others. There are great temptations to use an intimate knowledge of the technicalities of the statutes to circumvent the true spirit of the law. Such codes of ethics as the profession has do not strike at this and other acts which offend the moral sense of the people. Consequently, there has grown up a feeling of more or less distrust of the whole profession, and we [illegible] "A man does not go to law to get justice, but to get what he can." This is not as it should be, and is somewhat [illegible] all the three leading and longest established professions has as serious problems [illegible] as has the engineering profession.

A Comparison

[illegible] the engineering field, conditions appear to be chaotic. In spite of all the efforts mentioned above, it seems most difficult to raise the standards of practice, the rates of compensation or the standing of engineers among their fellow men. It appears to the writer that a broader and really more sensible study should be made of the possible attack of this problem.

Let us compare the practice of engineering with that of medicine. Not everyone who practices medicine is a doctor, entitled to write "M.D." after his name, with all the learning, the skill, the governmental supervision that those letters imply. The drug clerk who recommends and sells one something to ease an aching tooth or heal a bruise is performing true medical service. The housewife, with her simple skill and homely but efficacious remedies, practices medicine. The faithful nurse, who is given a considerable amount of discretion by the doctor and who is expected to act in emergencies during his absence, must be conceded to be a medical practitioner to that extent. All these and many others have an important part in treating human ills, but only the doctors, the "M.D.'s," belong to the medical profession.

We find, in turning to the practice of law, that the average business man tries to be well enough posted on legal principles to steer clear of entanglements. Lawyers' clerks, notaries, justices and others draw up legal papers and handle minor cases. Corporation claim agents seek to adjust legal claims. These and many others handle legal matters, but only the lawyers, admitted to the bar and licensed to represent others in court, are generally considered as belonging to the legal profession.

So in the profession of theology, it may be said without irreverence that we are all enjoined to minister to the wants of others in a humble way, and to inculcate principles of right living, but only the clergy, licensed and ordained, belong to the sacred profession.

In seeking to place the engineering profession upon the same high plane as these other three professions, it seems as if we lose sight sometimes of the fact that similar conditions exist in the practice of engineering. The attempt should not be made to gather everyone who, in a limited way, practices engineering or who may be called an engineer into the profession of engineering.

The young man, whether technically educated or not, who has charge of the construction of a piece of sewer work, for instance, will seldom be regarded by the public as a professional man, although he may be fitting himself for professional work later on. Neither will the young college graduate employed as instrument man, under the direction of a chief of party; he should be rated as a high-class mechanic, and is usually so considered by men of affairs.

Other classes which should not be included in membership in the profession which readily come in mind are the ordinary surveyor, the draughtsman (unless he be a designer), the commercial engineer (who uses his knowledge as an aid to salesmanship only), the engineer holding an executive position (in most instances), most engineering contractors and some contracting engineers (if we may be allowed to make the distinction), technically educated but not trained men (that is, men who have had an engineering education but who have not put it into practice outside of a class room).

It would seem as though all the consulting engineers, the engineers in private practice, and all others who think themselves entitled to call themselves professional men according to the above standards should get together, under the leadership perhaps of the American Institute of Consulting Engineers, and work up the subject along these lines: (1) Provide for some distinguishing title, such as "Consulting Engineer," or degree, like "D.E.," or better perhaps, "D. C. E.," or "D. M. E.," etc.; (2) arrange for awarding of these degrees from within; (3) draw up and enforce a code of ethics and rules of professional conduct, modelled after the physicians', especially as regards consultation with experts in the most important cases and in work out of the ordinary.

Mention has been made of the difficulties that have been met with in trying to secure legislation. It would seem at the start inexpedient to attempt much in this line, but, as an entering wedge, a brief act providing a considerable penalty against a person who hangs out a sign with the letters "D. C. E.," for instance, after his name, or who falsely represents himself so to be, would seem to be of such a nature as to receive favorable consideration by the average legislature. The enforcement of such an act would be of great benefit from the start, and additional legislation should be less difficult to secure as time passes and the engineering profession gradually establishes itself in the eyes of the people.

A combination rail brace and tie plate is being tried by the Chicago Junction Railway. It is made of ⅜ in. steel plate bent over and forged to fit the rail-flange and brace the rail. Two hundred of the braces have been in service for several months on wyes and other sharp curves in Chicago, and have greatly lessened the amount of attention required at these points.

Mr. W. A. McLean, Provincial Engineer of Highways of Ontario, stated recently that $900,000, the greatest sum yet expended by means of the county system of good roads, would be used this year under the supervision of his department. This shows a direct increase of $150,000 over that of last year, the government in each case bearing one-third of the expense as well as directing the improvement in each district.

Engineer's salaries in Chicago, according to an analytical report on salary and wage expenditures prepared by the Municipal Civil Service Commission, show a higher average than the salaries in any of the other city departments. The statistics show that the average annual salary in the engineering department is $1,843. In the city's engineering service there are 352 employees receiving 2.3 per cent. of the total expenditures. Seven engineers whose salaries range from $4,020 upward receive a total of $43,100. There are 40 positions paying $3,000 or more, 90 from $1,920 to $2,400, 103 from $1,500 to $1,740 and 111 from $1,080 to $1,320.

It happens now and then says Ferro-Concrete, that suggestions are made to the effect that for certain purposes concrete or reinforced concrete has been tried and found wanting. Let us admit, purely for the sake of argument, that such a thing may have occurred. What then? It would simply denote that concrete, especially if not properly prepared and applied, is not invariably immune from the destructive agencies that affect all other structural materials. The remote possibility that concrete may be affected by electrolysis, or the action of alkali and acids, has not infrequently been used as an argument by prejudiced or timorous persons, who may well be asked whether they know of any other material that will behave as well as concrete under the same conditions.

A Critic of Engineers as Superintendents

> I have tried a good many engineers as foremen and superintendents, but shall do so no more. Engineers seem to lack the ability to handle men. Perhaps their training has been too much in science and too little in human nature. At any rate they make poor foremen.

IN essentially the above words a contractor condemned the employment of engineers except as designers of structural work. Unquestionably the contractor spoke from experience, but, let us hope, from an experience that is not typical.

Reasoning a priori it seems incredible that an engineering training should in itself unfit a man to direct other men on construction work. But it should not be forgotten that a habit of thinking in certain ways is quite as essential to success as the possession of scientific knowledge. Perhaps many engineers fail as managers because sufficient repetition has not bred the habit of thinking about men, but rather has bred the habit of thinking about things—structures, machines, distances, weights, velocities.

"The proper study of mankind is man," and no amount of analysis of forces can serve to impart knowledge of the complexities of the brain. While the engineering student is learning mathematics and mechanics, the men with a shovel is learning not only his own nature but that of his associates—is studying men.

The young engineer is apt to imagine that he can skip this part of the necessary training of a manager of workmen. He is prone to step from a position as timekeeper to a position as foreman, or perhaps he would skip entirely these two grades and become a superintendent at one stroke. Herein is certainly to be found one reason why many engineers fail as contractors' superintendents and as contractors.

A road contractor said to the writer: "I would not have a foreman in my camp who could not run a steam roller, repair a gasoline engine, and work at a forge or with a carpenter's kit. A good foreman must be a handy man with tools. He needn't be an expert with tools, but he must savy them. And another thing—I want no foreman who looks like a dude."

This last statement contains a bit of wisdom that no man is apt to appreciate unless he has had the experience of receiving orders from a dude foreman. A workman resents receiving direct orders from a man who looks too clean to work himself. The young engineer who aims to manage workmen should begin as a workman, dressing and living as workmen live, learning their likes and dislikes, absorbing their humble philosophy.

Not the least valuable part of such experience is the discovery that men are tricky, often for the mere fun of "putting it over the boss," and particularly when the boss looks like a matinee idol.

Most of the colleges of mining engineering have summer schools of mining, where the students spend several months working underground with the miners. This sort of experience is needed by students of civil engineering, particularly so by those who plan to manage construction work. Failing to receive such training at college, the young civil engineer would do well to spend a year or more, after graduation, working at a forge, drilling, running a "donkey," shovelling and studying men—all the while studying men.—Engineering & Contracting.

The riprapping of the Gatun Dam on the lake side will be done with hard rock for a distance of 10 feet above and below the normal level of the lake, according to the "Canal Record." About 175,000 cu. yd. of material will be required, and a steam shovel has been set to work in a borrow pit to produce it. The trap rock from the Bas Obispo dike of Culebra cut, a large amount of which had been stored at Gatun for this purpose, could not be used successfully because it was found to weather too rapidly. That from the borrow pit is hard, and stands both air and water well.

Cement Production in 1912

THE statistics of production of cement given herewith, will be subject to but slight variation when complete returns shall have been received. Estimates have had to be made for two firms had not yet reported, but the totals given are probably with a half of one per cent. of the final returns. The record for the past year is of particular interest, in view of the widespread demand for cement. Congestion of freight traffic no doubt militated somewhat against the eastern mills supplying western requirements and in order to relieve the situation the Federal Government reduced the duty one-half on importations during the period from June 12 to October 31, inclusive. Statistically the important features of the industry during the year were an increase of over 26 per cent. in the Canadian output, an increase of over 116 per cent. in imports and an increase of over 34 per cent. in total consumption. Canadian mills supplied 83.2 per cent. of the consumption as against 90 per cent. in 1911.

The total quantity of Portland cement, including slag cement and natural Portland, made in 1912, was 7,169,184 barrels. The quantity of Canadian cement sold or used was 7,120,787 barrels, valued at the mills at $9,083,216, or an average of $1.27½ per barrel. The total imports of cement were 5,020,446 cwt., equivalent to 1,434,413 barrels of 350 pounds each, and valued at $1,969,529, or an average of $1.37 per barrel. The total consumption of Portland cement, therefore, neglecting a small export of Canadian cement, was approximately 8,555,200 barrels.

A brick and tile works is to be started at Charlton, Ont. The plant is expected to be ready by the spring. The capacity will be 30,000 bricks a day, in addition to a large tile output.

Cleanliness was second to godliness, even amongst the Romans, and, as we still appreciate, cleanliness is impossible in any city that has no decent water supply. Mr. Bannister Fletcher explained in a recent lecture at the British Museum how the Roman desire for pure water led to the building of some of Rome's most practical splendours. An ample water supply was needed by the Imperial City. It was found in the hills not very far away, and to bring it in, gigantic works had to be undertaken. It may be asked why they expended so much money and labour in conveying the water at such a height instead of underground. The reply is very simple, for pipes had to be made of costly lead or bronze, and they had not the supply of lead in other places which was found in the Mendip Hills for the baths of Bath, and bronze was still more costly. It was thus cheaper by forced human labour to construct these stone or concrete channels, carried on great arches across valleys and rivers.

The Canadian Society of Civil Engineers

It would appear from the following letters that interest in the discussion of the work and status of the Canadian Society of Civil Engineers remained unabated. The communications are of special interest in that they include letters from two United States engineers of international prominence, both of whom speak from a wide experience of society work. On the question of the employment of alien engineers the stand taken by each constitutes an endorsation of the views of Mr. W. F. Tye, immediate past president, published in our issue of February 26. On this score the reminder may be timely that the original objection arose out of the employment of alien engineers on government work only; moreover, so far as we know, there has been no desire to restrict any work to the Canadian field where incompetency or inexperience has been known to exist. We hope to have an interesting presentation of the western viewpoint for publication in an early issue. It would seem that much might yet be said profitably concerning both the methods of stimulating greater practical interest in the work of the Society and the organization of provincial associations.

The Best Man—Irrespective of Nationality

New York, March 12th, 1913.

[illegible]

Being an old member and once a Director of the Canadian Society of Civil Engineers, I have perused with interest the several issues of the Contract Record in which are contained discussions on the present status of the Society, and also on the subject of engaging alien engineers for engineering work in Canada.

Myself an "alien engineer," I am afraid that anything I may say will have very little weight with those who believe that political boundary lines should limit the sphere of activity of professional men. Nevertheless, having always had the highest esteem for Canadian engineers, and wishing that the national society's professional standing, influence and prosperity be second to none—considering also that we engineers all belong to the same family, I do not hesitate to express my views.

Regarding the first question, "How can the standard and influence of the Society be raised?" Surely this can be done only by convincing the members and the public of the Society's greater value. The value of a society lies in the association of experienced minds for the purpose of crystallizing and confirming opinions, promoting the interests and advancing the standards of practice. These results are obtained by having meetings for the presentation and discussion of papers and subjects, and by doing committee work on designated topics.

When no papers or discussions are presented on live and interesting subjects, and when no effective committee work is done—in short, when these two lines of activity in the Society go down, its influence and standing will also go down. The course to be pursued in such a case is, therefore, hereby indicated. If a society have a good reason for existing, special efforts must be made by its administration or leading members to select subjects and authors, so as to have interesting and valuable meetings. As engineers are modest as a rule, and many are of a retiring disposition, it requires more effort on the part of the society's government to suggest and procure suitable matter to be brought before the society, than in some other professions, and it may be hopeless to wait for the members themselves.

The most experienced engineers are generally the busiest and have the least time to write papers. But they are generally the best men for administrative duties, or to be placed on committees, where they can give advice and arrange matters so that others with more time may accomplish the desired results. Busy men are more available for discussions than for writing papers, and they should be specially urged to contribute in this way for the general good.

Interest is created and work promoted by appointing committees on all important subjects, particularly those that are developing rapidly. Regular reports of such committees to the membership, and discussions thereon, often have better results in arousing interest than waiting for exhaustive papers.

A further means of increasing interest in a society whose membership spreads over a large area, is to have meetings held in different parts of the country instead of only at headquarters.

A society's work, to accomplish the above results, must be supported not only by sufficient executive work, by permanent headquarters and by frequent or at least periodical publications of the society's work, progress and interests, but also by sufficient funds to cover the expense of such work.

Regarding the second question, "What should be the custom regarding the employment of alien engineers in Canada?" I believe in every country having its national society, just as I believe in every large city having its own local engineering society or club. There is no nationality, however, in engineering science any more than in any other branch of science. We all esteem, honor and solicit the opinions of men of accomplishment in other countries as well as our own. Societies frequently honor aliens by electing them as Honorary Members. The American Society of Civil Engineers thus elected Sir Douglas Fox and Sir Wm. H. White, of England, in appreciation of their standing. A number of eminent Englinsh engineers have also been consulted regarding works in America, and Americans have been consulted in Europe. As the conditions in Canada resemble those in the northern United States more than those in Great Britain, India or Australia, engineers of special experience in the United States have occasionally been preferred for appointment in Canada because the best practicable and economical advice was expected from them.

I see no difference between Canada, England and America so far as engineering science is concerned. Water flows according to the same laws in all countries. But there are differences in this application of engineering science according to the stage of development of a country and its topography and climate. An engineer brought up and educated on the plains of our continent would not be the best engineer

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[*] The letters published herewith form part of a discussion which originated out of an editorial published in our issue of February 5. Communications since received have been published in our issues of February 26, March 5 and March 12. In addition to a number of letters published under noms de plume and also to those published herewith, communications have been received from the following: Mr. W. F. Tye (president 1912), Toronto; Mr. H. Victor Brayley, Secretary, Ottawa Branch; Mr. Henry Holgate, Montreal; Professor L. A. Herdt, Montreal; Mr. F. C. Gamble (vice-president), Victoria; Mr. A. Currie, City Engineer of Westmount; Lt.-Col. W. P. Anderson, C.M.G., (past president), Ottawa; Mr. W. H. Breithaupt, Toronto; Mr. A. F. Macallum, City Engineer of Hamilton; Mr. Frank Chappell, Town Engineer of Oshawa; Mr. W. Murdoch, City Engineer of St. John, and Mr. F. [illegible]

for difficult mountain work. An engineer brought up on work having a high class finish, as in Europe, or near the eastern coast of America, would not be the best engineer for pioneer work in the west, where results are required at smaller cost. An experienced engineer trained north of our boundary line would, however, be precisely as good an adviser as one trained south of the same, provided the personal experience were sufficient.

Therefore, I believe in the engagement of those professional men who have had the experience and knowledge required, whether they be found in another city or in another country, or whether they be old or young. Efficiency alone should be the guide if the interest of the employer be uppermost.

To prove my long adherence to the above views, over 25 years ago I recommended the appointment of the late Mr. Alan MacDougal, of Toronto, for a large piece of work in St. Johns, N.F., where I held a professional engagement and was asked to recommend a successor who could remain in the city. Later, I recommended the late Mr. E. H. Keating, then City Engineer of Halifax, N.S., for the city engineership of Duluth, for which position, also, I was requested to suggest the best available party. Not the least indication of my appreciation of Canadian engineers, is the fact that in 1889 I selected Mr. T. J. McMinn, then Assistant City Engineer in Toronto, to be my principal assistant in New York and retained him for many years, until he became assistant Secretary of the American Society of Civil Engineers—a position that he still holds.

Very truly yours,

Rudolph Hering.*

Appointments by Merit

Editor Contract Record:

The Canadian Society of Civil Engineers has great possibilities of good. Considering the enormous extent and relatively sparse population of Canada, its membership and organization are remarkable.

The American Society of Civil Engineers maintains only a central organization, with headquarters in New York. It has been successful in securing and maintaining the interest of engineers from the whole country. About one-quarter of the entire membership resides west of the Mississippi River. The question of whether such a central organization is adapted to the needs of the Canadian Society, or whether additional branches are desirable, is an important one. Unquestionably the dues should be raised, if necessary, and expense should not be spared in doing everything that can reasonably be done for the members.

I want to express my appreciation of what Mr. W. F. Tye, Past-President of the Society, has said in your issue of February 26th, in regard to free trade in engineering. I second his statement most heartily.

Engineering is specialized to a greater extent than any other profession. New methods, and more economical methods for doing particular things, are constantly being developed by engineers. Such methods are most commonly and best applied to new work by engineers. When new methods cross a political border, engineers will naturally go with them.

It seems to be a reasonable view, considering the interests of the people who pay for the work, that wherever engineering work is to be done, it should be placed in the hands of the engineer whose training and experience best qualify him to carry out the work economically and well, regardless of state or national lines.

There is a strong tendency for any employer to go first to local engineers for technical advice. This serves as a natural measure of protection in a large degree. This protection will not suffice to prevent the employment of outside engineers in cases where special experience is desirable, and can be had only by going beyond the local fields, and it is undesirable that it should be strengthened to the point where it will.

I am strongly opposed to action being taken by any national engineering society which tends to discrimination against engineers because of geographical lines.

Very truly yours,

Allen Hazen†

The Calgary Viewpoint

Editor Contract Record:

My attention has been directed to the various correspondence published in your issue of February 26th relative to the Canadian Society of Civil Engineers. This open discussion in your columns is indeed a splendid idea, and may help to "resurrect" some of us "dead ones," who take little or no interest in the Society.

Unfortunately for the practical man who enjoys a life of fellowship and sociability, or fortunately for the technical man who enjoys the life of books and study, we form a society which, in its main principal, should be highly technical. Connected with it there should be a well-organized "bureau of information," capable of dealing with any subject or branch of engineering in which investigation might be required by its members. This bureau should be handled by a well-informed man, located at the headquarters of the Society in Montreal, where the most complete engineering library of Canada should also be located. From the head office, also, should come all the standard specifications, and matters for publication, duly passed upon by the executive of the society, who are and should always be the best and ablest engineers in the country. Further, I believe that this bureau should publish a monthly pamphlet, covering the general happenings of the parent society and the branches, encouraging every member to become active in the interests of the Society at large.

The building, equipment and staff of the Society headquarters at Montreal should be the best possible—worthy of one of the largest Societies in Canada, supported by a group of progressive men. In every city of the Dominion there should be branches of the Society, organized and supported by the engineers in that district. These branches should have good club rooms and offer such attractions that it would be unnecessary to form independent city engineering clubs.

I do not believe in having the branches controlled in all their features from Montreal. Each individual group of engineers should be allowed to work out its own destiny, at its own expense. The only standard fees collected at headquarters should be so much per head for each member, paid in a lump sum by the branches, together with the fees of non-resident members.

Seeing that I am not a member of any branch and that I do not reside in a locality where I can enjoy the atmosphere of the Society other than through technical papers (although I understand that Calgary is taking steps to form a branch) I am not in a strong position to criticise the management of the branches, but it would seem that the head office were endeavoring to support existing branches and discourage the establishment of new branches. If this be so, it is very wrong. We must realize that we are a very indifferent group of men. We have no representatives in Parliament and only occasionally do we appear in municipal affairs other than as paid employees. In our profession we are partial to the ex-[illegible] "empire-builders," whereas the public regards us more or less as necessary evils, providing the medium through which money is spent in vast quantities. This fact is largely brought to our notice by the towns and cities, from coast to coast, who are quarrelling with their engineering departments. Why all these quarrels? We plan our works for least resistance but live along the lines of most resistance. Perhaps it is because we are so technical that we cannot argue business principles with business men—and, after all, business really has more to do with empire-building than roots and reciprocals. How can we in Calgary enjoy any social life through a society located at Montreal? We should have a trial at the [illegible] through the business management of our own branches.

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*Of Messrs. Hering & Gregory, consulting engineers, New York City.

†Of Messrs. Hazen & Whipple, consulting engineers, New York City.

In regard to alien engineers, I cannot think that by legislation or otherwise their freedom should be restricted. They should enjoy the same privileges in this country as we do in theirs. If our governments are partial to foreigners it is an unfortunate state of affairs and the Society should work hard for its members by memorializing those who have the appointments in their hands. In my opinion any other method would be very unprofessional.

In conclusion, I believe in having a national society with its members thoroughly in harmony, through the medium of their social and technical life. This can be accomplished only by means of an efficient system of branches throughout the Dominion. Encouragement should be given to meetings where the technical side of our life would get its proper start.

We are indeed a peculiar class of men, "sufficient unto ourselves." In many cases our highest ideal is to take our knowledge with us to the grave, never having been encouraged to swap ideas before the fireplace of the clubroom.

Yours very truly,

E. L. Miles.

Vancouver Speaks

Editor Contract Record:

Regarding the Montreal Convention of the Canadian Society of Civil Engineers and the correspondence that has appeared in the Contract Record, I would venture a few remarks.

It is my belief that the majority of the British Columbia members have every desire to aid in strengthening the parent Society and improve the standing of the Society throughout Canada. They believe that they can best promote this work by securing more authority for the Branches, their ultimate hope being that the Society as a whole will come to be regarded as an authority and that the membership will be considered by governments, municipalities and corporations in making appointments in the same way that the Institute of Civil Engineers is in Great Britain.

The protests that have been made by the British Columbia Branches against the employment of alien engineers have been confined entirely to those engaged by the government and municipalities. No protests have been made against the employment of engineers of any nationality on works other than those involving money raised by taxation. There is nothing to which American engineers can take exception in this, as it is simply asking that our governments follow the example of the United States and all other nations. The protest is not against American engineers, but against the lack of knowledge of our own governments of the fact that qualified engineers can be obtained without sending abroad. We wish to educate the authorities by making the Canadian Society so strong that they will naturally look among its members before looking elsewhere. The British Columbia Branches were not the only ones requesting more authority. A similar request came from Winnipeg, and a Montreal Branch was even suggested.

I fully realize that there are difficulties to be overcome, as outlined by Mr. Tye. It may be that these can be overcome after careful consideration. I believe that the President and Council have the interests of the Society thoroughly at heart, and that whatever is done it is necessary that national headquarters be retained and strengthened.

In regard to the remarks made regarding the number of engineers not members of the Society it is my opinion that this number is not as great as some of the members claimed. In British Columbia, engineers have been coming in more quickly than we can elect them into the Society, but we are getting after the qualified ones and absorbing them rapidly. This work can best be done by active branches.

I do not think that the number of qualified engineers outside the Society in British Columbia is any greater than in the east. In any event, in proportion to population, we have about double the number of engineers that the Society has as a whole.

Yours faithfully,

C. E. Cartwright.†

Constructive Criticism

Hamilton, March 12, 1913.

Editor Contract Record:

A perusal of the letters from prominent engineers, regarding the work and status of the Canadian Society of Engineers, and the editorial on the subject contained in your issue of February 26th, reminds me that I may belong to that class of members who have been somewhat indifferent to the affairs of the Society.

Doubtless, criticism of the nature contained in your editorial and in the published letters will be beneficial and tend to awaken the members to existing defects. Suggestions have already been made and others will be forthcoming for the benefit of the Society.

The Canadian Society of Engineers is a truly representative one, it being composed of nearly all Canadian engineers. It would seem, therefore, that as the national engineering body of the Dominion, the duty of its members should be to do all in their power to increase its usefulness to the fullest extent. Criticism, as expressed in one of the letters, should be welcomed by the Society.

The work of the Society may be divided into two classes. In the first place there is the educational work, which includes the diffusion of knowledge by means of papers, standardization and other purely engineering matters. Then there is another class of work which has been called the "business section," under which head is included the organization of branches, financial management, protective measures and other matters of a purely business character. It would appear from the remarks made in some of the letters that there were cause for complaint in this latter department. The papers of the Society, I think, are first-class, and compare favorably with those of any other engineering society in the world. There are two kinds of papers: those which deal with the theories and principles of engineering, and those which describe particular work done under the superintendence of the writer of the paper. The latter kind should be encouraged, as mostly all classes of engineers can contribute a paper of this sort and the preparation of such work appears to give the writer greater interest in the Society.

It seems to me that the following suggestions would be beneficial if put into effect. In the first place, we should have a secretary or general manager who would devote his whole time to the Society. Under this official there should be two subordinates, one to look after the professional work and the other the business section. Secondly, active en-

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[illegible] Engineering Company, Limited, Winnipeg, Calgary and Vancouver.

†Of Cartwright, Matheson & Co., consulting engineers, Vancouver.

couragement should be given to the preparation of papers descriptive of work designed or superintended by the writers of the papers. Thirdly, consideration should be given to the various matters now under discussion and action taken as soon as possible.

There is the question of whether the present system of having the Montreal headquarters and the various branches established as at present is preferable to having headquarters at Montreal and provincial associations. And there is the matter of employing aliens. In the latter regard, I am of opinion, generally, that engineering work should be done by our own engineers. At the same time it may be advisable, in cases, to employ foreign engineers, not because of superior training or intelligence, but because conditions in their country may have familiarized them with certain classes of work with which we may not have had much experience.

Yours very truly,

E. G. Barrow.*

A Great Opportunity

Editor Contract Record:

While I have not taken a great deal of personal interest in the affairs of The Canadian Society of Civil Engineers for some years, I have been considerably interested in the discussion in The Contract Record.

In my opinion, if an adequately paid permanent secretary were appointed matters would be materially improved. Probably the financial affairs of the society are in such shape that it would be necessary to increase the fees in order to meet this additional expenditure.

One feature I notice in connection with the affairs of the society is the great delay in receiving reports and copies of papers. This, I consider, is a very vital point. The engineering bodies of other countries act promptly in sending out reports and copies of papers and I think it stimulates interest in the work of the society.

Another matter that has occurred to me is that the society is too local—too much of a Montreal affair—and the offices are held by too many Montreal men.

Still another feature is the lack of interest on the part of the older members—and this applies not only to the ordinary members but also to ex-members of the Council and Past-Presidents, Vice-Presidents, etc. In addition to this, there is a great lack of interest on the part of outside members, due very largely, I think, to the demands of their profession.

It is a pity that we cannot have a strictly up-to-date, aggressive national organization. There is not the slightest doubt we have as good material among our engineers and engineering students as any other country in the world—and in no other country are there such opportunities as in Canada at the present time.

Yours sincerely,

A "Progressive."

Permanent Secretary the Remedy

Vancouver, B.C., March 6th, 1913.

Editor Contract Record:

In reply to your letter of February [illegible] asking for my views regarding the Canadian Society of Civil Engineers, the work and status of which are discussed in your issue of February 26th, I think that this movement of your paper is a timely one and apparently it is obtaining the attention of many members of the Society.

There is a general impression, at least amongst the younger members, that the position of the Society in respect to general engineering and public affairs of the Dominion, is not as strong as it might be. This does not seem a very satisfactory condition for the Society to be in, where so many new members have been added in recent years.

I think I am expressing the opinion of a great many members of the Society when I state that the remedy which seems desirable for the welfare of the Society, can be obtained by the resignation of the present Secretary and the appointment of an active secretary who will give his entire time to the work. The increased membership and the establishment of the various branches throughout the Dominion now call for an able secretary who can gain the confidence of the members by a more practical knowledge of the requirements than can be obtained from the class-room of a university.

Apparently the work of the Society is of so little importance or consequence that a secretary need only give one-third of his time and attention to its needs. Under such a condition the Society is doing remarkably well in merely growing in membership and sending out papers occasionally to show what the students were doing the year before.

Perhaps the members of the Society should be divided into two groups, Liberals and Conservatives, or Democrats and Republicans, to ensure a healthy change in government occasionally. And we might do worse than elect the Progressive party for the next term.

Yours sincerely,

H. K. Dutcher.†

Erratum

In the closing paragraph of a letter by Mr. W. Murdoch, City Engineer of St. John, published on page 67 of our issue of March 5th, the word "unasked" was rendered, by a typographical error, "masked." The whole paragraph should have been given as follows:

"The Canadian Society embraces in its membership citizens of the entire world and residents of all countries. Of our fourteen honorary members only four reside in Canada, and of the full membership eighty-one are registered as residing outside of Canada. It would appear to me, therefore, that a technical society with such a promiscuous membership would act unwisely if it were to offer unasked advice to bodies seeking engineers, especially if that advice were, in effect, to keep inside the bounds of the Dominion."

A deputation of agents and users of steam waggons in Montreal waited on the Legislation Committee of the Council, and asked that the latter should control, and not prohibit, the use of these waggons. Montreal has suffered from lack of transportation facilities so far as contractors are concerned, and the deputation desired to add to the means for the convenient and economical haulage of heavy material. Mr. P. S. McKergow, of the National Brick Company, of Laprairie, headed the delegation, which suggested that the loads of the steam waggons be limited to five or six tons, that for every ton of weight there be two inches of tire, and than smokeless coal be used. It was also pointed out that the cost of operating a steam waggon was less than [illegible] Mr Janin, the chief engineer.

The preliminary plans for the city of Calgary, as suggested by Mr. T. H. Mawson, will probably be completed about September this year. Some plans and sketches will be ready before that for exhibition at Chicago at the national conference of town planners. The complete plans will be shown at the Royal Academy in London, England, 1914, Calgary being one of the first western cities to undertake this work.

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*City Engineer, Hamilton, Ont.

† [illegible]

The Purification of Water by Slow and Rapid Sand Filtration

In an interesting paper on the subject of Purification of Water by Slow and Rapid Filtration, read before the Canadian Public Health Association, Mr. T. Aird Murray, M. Can. Soc. C.E., Toronto, furnishes valuable data and evidence relative to water filtration systems. Mr. Murray expresses the opinion that both systems have qualifications which may meet local demands. His general principles and conclusions are summarized as follows:

Summary

(a) Filtration of water should be considered chiefly from the point of view of removing dirt or suspended matter from water.

(b) Slow sand filters or rapid sand filters well designed and skillfully managed will, from an efficiency point of view, equally remove dirt and suspended matter from water.

(c) The choice of either slow sand or rapid filtration to meet the requirements (a) and (b) is a matter of local conditions, character of water to be treated, climatic and general environment factors which can only be balanced and determined upon by an expert.

(d) Slow sand filtration has the natural advantage over rapid or mechanical methods in that it requires no chemicals in the form of a coagulant and more closely follows nature's method of purifying surface water to spring water conditions.

(e) The area of land required for rapid filtration is comparatively much smaller than that required for slow sand methods.

(f) Where it is advantageous to have the plant and operation entirely under cover the choice must be with rapid filtration.

(g) The first cost of installation of rapid filtration is about one-half that of slow.

(h) The maintenance cost is determined by the amount of coagulant required for rapid filtration as against the costly process of removing and cleaning the sand surface of slow sand filters. When the amount of coagulant (sulphate of alumina) does not exceed 1 grain to the gallon the maintenance of rapid filtration is below that of slow sand.

(i) When it is a question of removing disease infection and rendering a water entirely safe, neither system can be absolutely depended upon.

(j) Disinfection is the only method by which an infected water can be guaranteed safe.

(k) Disinfection, by the economic and generally acknowledged methods, can be better applied to rapid rather than to slow methods of filtration. As with rapid filtration the disinfectant can be applied before filtration and not after, as must be the case with slow sand methods.

(l) The assumption that slow sand filtration is more suited to clear water conditions and rapid filtration to turbid conditions has no clear evidence to support it. The opposite is probably the case, viz., that clear water is not capable of forming the film or carpet surface necessary for efficient bacterial removal with the slow sand process, and that a coagulant is necessary in order to artificially form this bacterial straining film.

(m) Slow sand filtration is entirely unsuited to highly turbid water, where constant removal of the sand surface would be required to prevent clogging.

(n) Rapid sand filtration is suited to either fairly clear water or very turbid water, as the method of cleaning the sand is easily controlled, of short duration, and effective without removing or handling the sand.

(o) Cleaning the surface of slow sand filters requires the personal contact of workmen. With the rapid methods compressed air and reverse flow of the water under pressure meets the requirements.

It may be concluded, generally, with the introduction of disinfectants to water, that rapid or mechanical filtration will, in the future, assume even a more prominent position as a method of water purification than it has in the past. Care, however, will have to be exercised by municipalities in their choice of design of plant. No doubt town and city engineers, aldermen, controllers and works commissioners will, when the occasion arises, be bombarded by agents and others representing all kinds and sorts of rapid filter contrivances from the pressure filter to the mechanical gravity types, all guaranteed to provide the very highest efficiencies independent of suitability to local conditions. The layout of a plant to meet the local requirements and the choice of the various manufactured parts in order to provide an efficient unit can only be trusted to the professional expert who is absolutely independent in his choice, and who is cognisant of the various types on the market and their efficiency to

The paper is illustrated by photographs and plans of the filtration plants at Saskatoon, Montreal and

Filter Unit Building, rapid filtration plant, Montreal

Toronto, reproduced herewith. The cost data on the operation of various plants is valuable. The following interesting description of the Saskatoon plant is included in Mr. Murray's paper:

The Saskatoon Rapid Filtration Plant

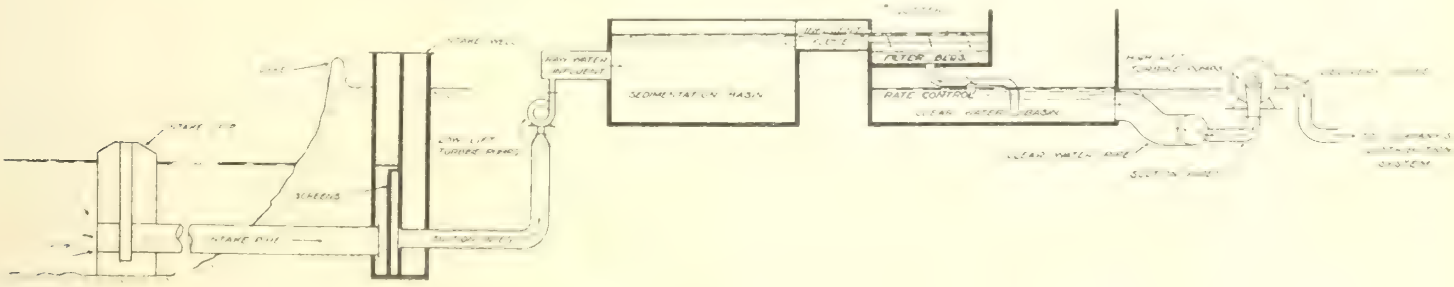
Early in the year 1911 the City of Saskatoon entered into an agreement with The Roberts Filter Company, of Philadelphia, for the installation of a rapid filter plant at a cost by contract of $55,980. The capacity of the plant is 4,000,000 Imperial gallons per day. The design of the works is based upon the Harrisburg, Pa., plant. The work was completed early in 1912 and has continued in operation to produce a water minus turbidity and color, with an effluent containing from 0 to 8 bacteria per cubic centimeter.

The water to be filtered is taken from the Saskatchewan River at a point opposite the existing pumping station. It flows by gravity to two deep wells from whence it is pumped to the existing storage basins, which are converted into a sedimentation basin.

This basin is divided into two compartments by a wall extending across its centre. The water is admitted to that section of the sedimentation basin farthest from the filtration plant through three bell-shaped delivery pipes; flows toward the central division wall, is there collected into three bell-shaped pipes, which extend to within 12 inches of the high water level in the basin affording a weir effect to the naturally subsided water. It is then conveyed through a cast iron pipe around the central division wall to the second half of the sedimentation basin which acts also as a coagulating basin. Provision is made for feeding sulphate of alumina into the pipe line conveying this naturally subsided water to the second half of the sedimentation basin or coagulating basin. It is then delivered through similar bell-shaped pipes, flowing toward the end of the coagulating basin, collected into bell-shaped pipes as described in the preceding basin, which convey the water to the pipe leading to the filters; provision being made also for feeding sulphate of alumina to the water in this pipe just after leaving the coagulating basin.

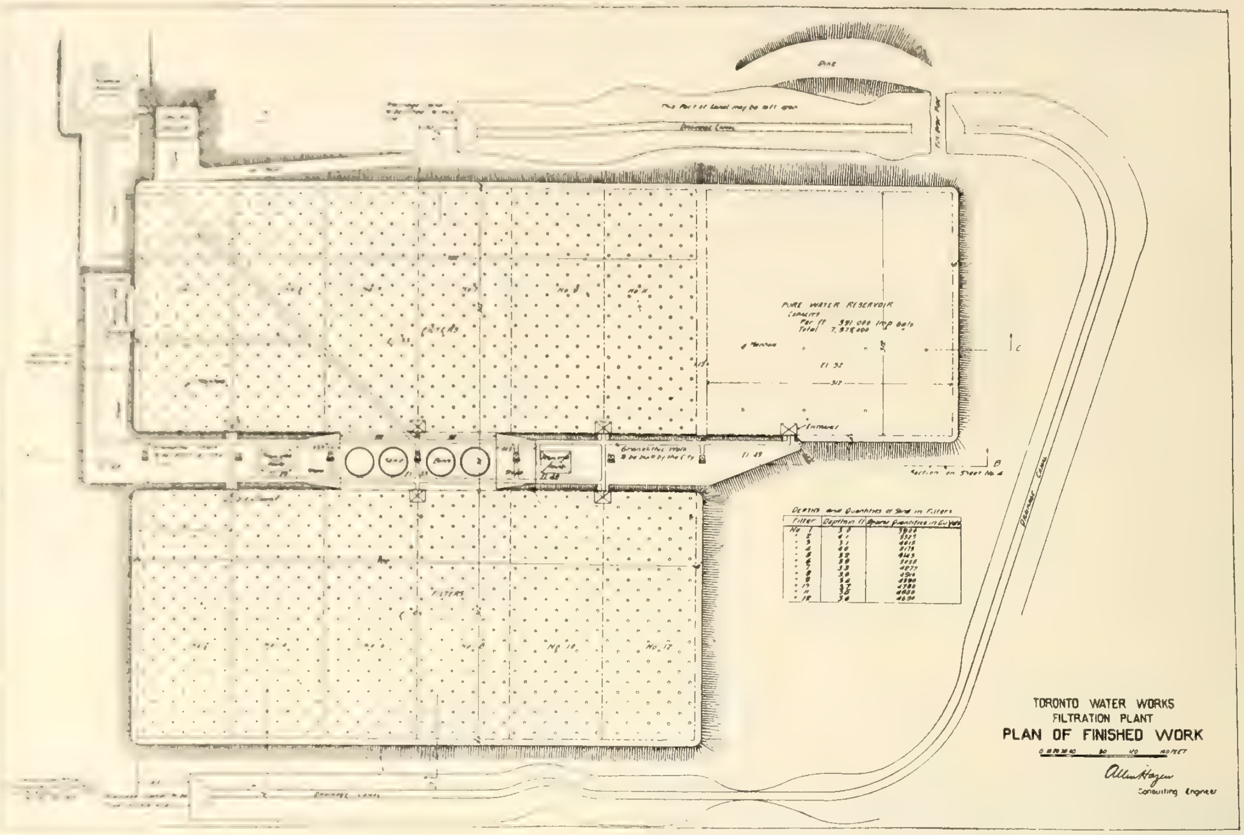
The treated and subsided water then flows through the 20-inch influent main down the filter gallery and is distributed through 10-inch pipes to each of the six filters.

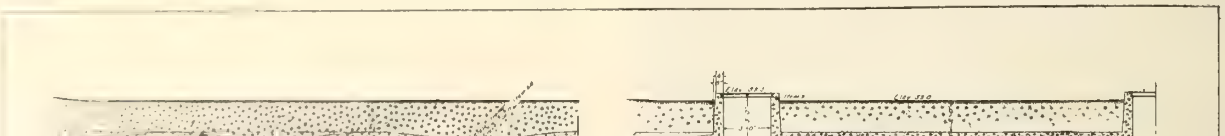
During the process of filtration the water flows into and fills the concrete pocket in front of each of the six filter units, rises to a level with the tops of the steel supply and wash trough, spills over onto the sand bed, filters through the sand and gravel and is collected by the bronze strainers into the wrought iron



Rapid filtration plant, Montreal. Section showing general working principle

Rapid filtration Plant, Montreal


PURE WATER RESERVOIR
Capacity
Per ft 391 000 Imp Gals
Total 7,578,000
FILTERS
Entrance
Section on Sheet No 4
Depths and Quantities of Sand in Filters
Filter
Depth in ft
Quantities in Cu Yds
Drainage Canal
TORONTO WATER WORKS
FILTRATION PLANT
PLAN OF FINISHED WORK
Allen Hazen
Consulting Engineer


Springing Line
Sand line
Section through Piers
Section through Groin
Section through Division Wall
Lateral Drain
Section through Outside Wall
TORONTO WATER WORKS
FILTRATION PLANT
FILTER DETAILS
MASONRY
Allen Hazen
Consulting Engineer

strainer system. It is then conveyed through the central cast iron manifold collecting pipe and across the front of the filter to the effluent rate controller.

The effluent rate controllers are set to deliver a given quantity of water under a head of 10 feet 6 inches, and are capable of adjustment to within 30 per cent. above or below the normal rate for which they are designed; they in turn deliver the filtrated water to the filtered water storage reservoir, located beneath the six filter units.

The filtered water then flows by gravity from the storage reservoir to the high duty pump suction well, from whence it is pumped to the stand-pipe, from which it flows through the distribution system to the consumers.

Each of the six filter units is equipped with hydraulically operated valves, which permit the filter being controlled from an operating table located on the operating floor immediately in front of each unit.

The equipment includes a centrifugal pump for supplying water for washing the filters, also a blower for supplying air under pressure during the washing process. Each of these units is independently driven by an electric motor mounted on the same bed plate.

The plant is so arranged that the filters can be washed either by using the centrifugal wash pump for filtered water or by filtered water taken from the force main leading from the high duty pumps to the stand-pipe, affording an auxiliary wash in case of accident to the wash-pump.

During the washing process the inlet valve to the filter is closed. The water on the sand bed allowed to filter through the rate controller into the filtered water storage well. The operator then signals by the use of an electric bell controlled from the operating table for the engineer to start the blower. The air supply valve being opened on the filter, the air is admitted to the sand bed, and the latter is scoured for a period of two minutes, after which the air supply is shut off and the wash pump placed in operation and filtered water admitted to the filter through the manifold and strainer system, causing a reverse current for a period of two minutes, which washes the sand, carrying the heavy deposits which have been filtered out of the water during the process of filtration to the supply and wash trough, from whence it is carried to the waste and thence to the drain. This alternate air and water washing is continued for a period of from six to ten minutes, the time depending upon the cleanliness of the sand bed. The duration of the air scouring and washing periods being diminished after the first period of two minutes each.

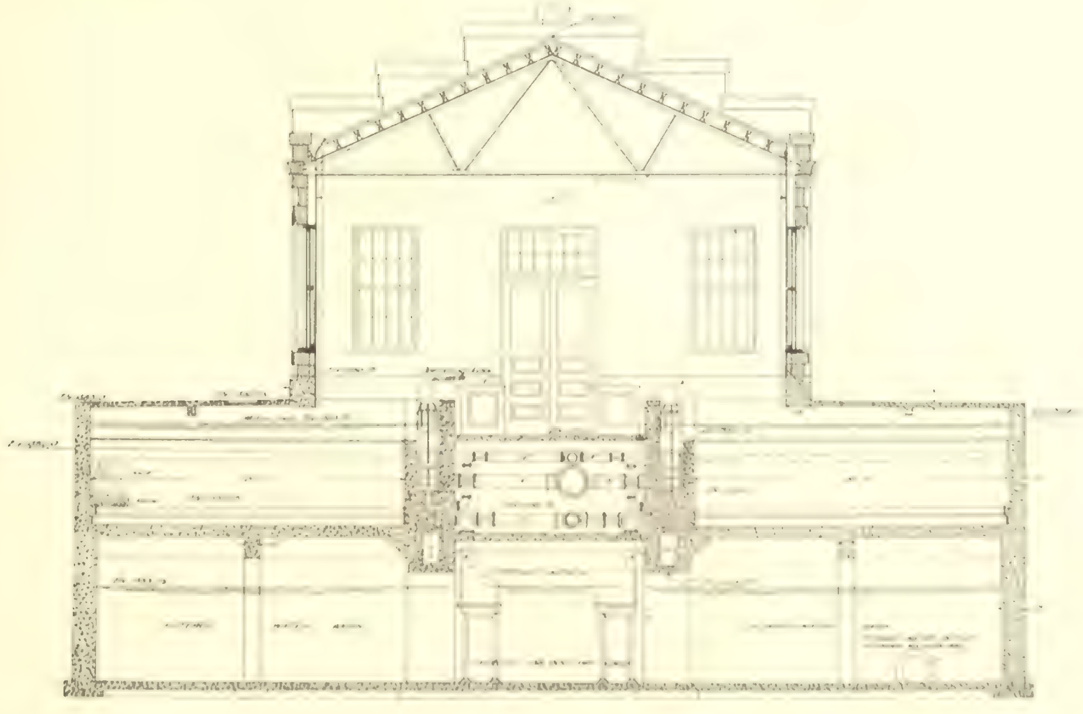
After the washing process the sand settles back into its normal position in the bed, the heavier particles settling on the bottom with the finer grades toward the surface, or the sand settles in relation to its specific gravity.

The air, the wash water supply and waste valves are now closed, and the influent and filtered water to waste valves opened, allowing the treated water to filter through the sand bed as during the process of filtration, the water passing to the drain until the clay particles which were not raised during the washing process to the waste trough are carried off to the drain and until the water is about the color of the treated water being supplied to the filter.

The filtered water to waste valve is then closed and the effluent valve opened, placing the filter in operation and allowing the water to pass through the effluent rate controller to the filtered water storage well beneath the filters.

On each of the operating tables is located a test

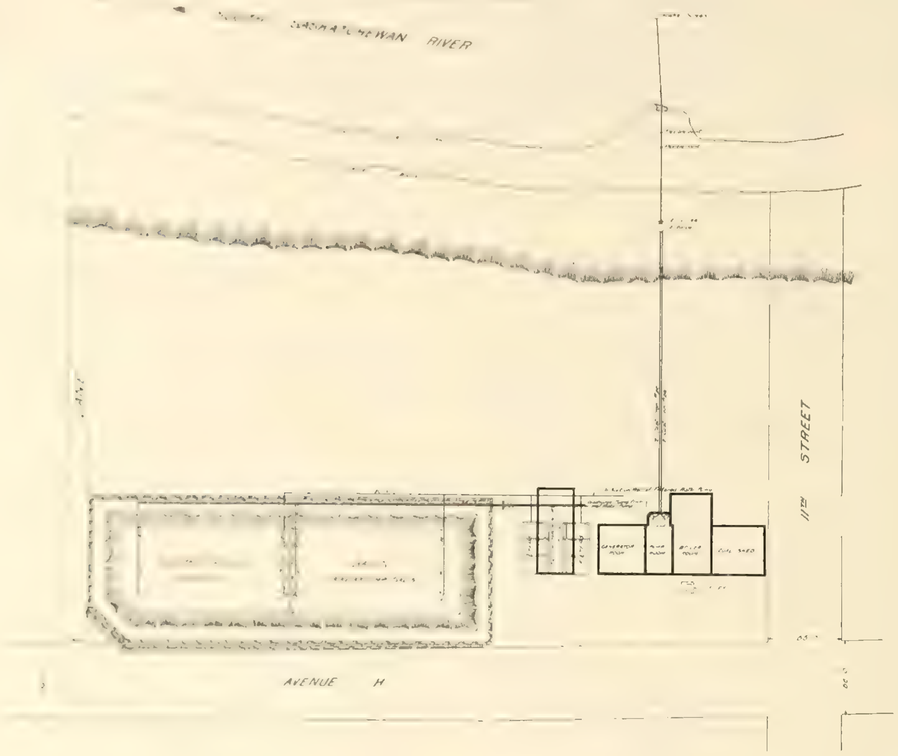
SASKATOON FILTRATION PLANT C



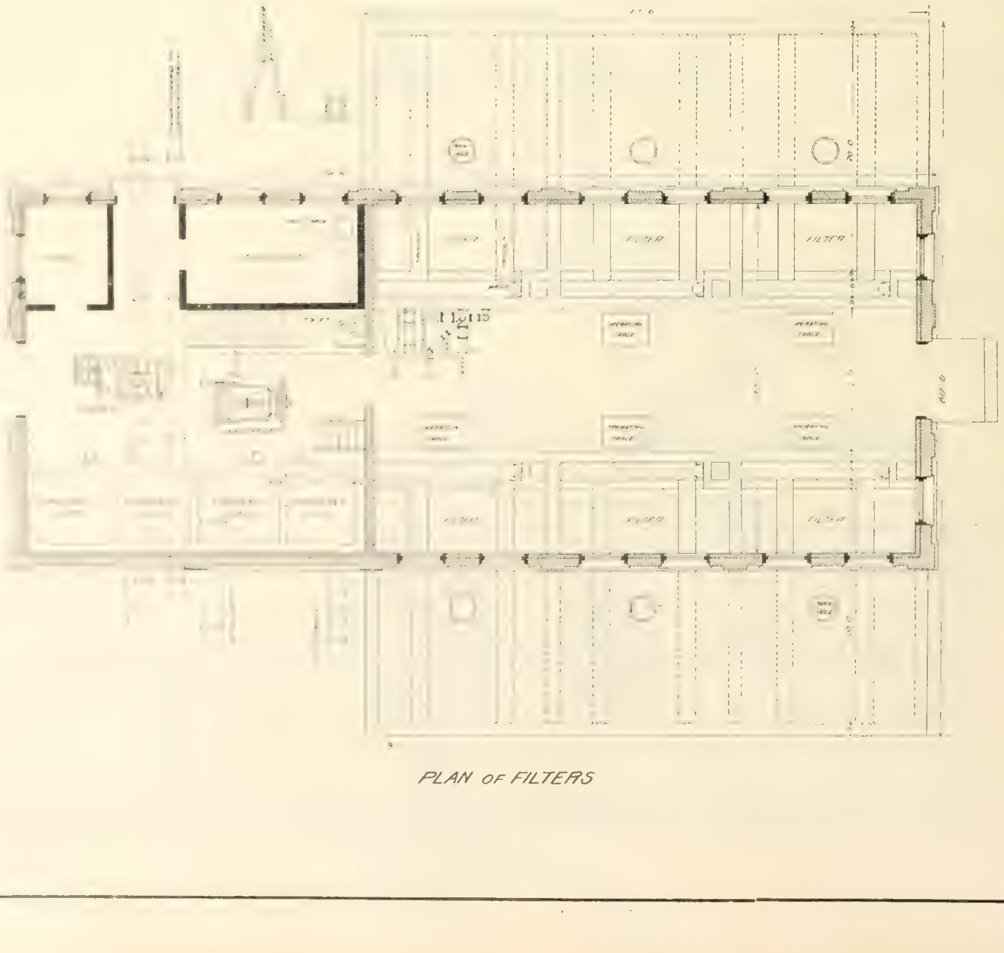
SECTION THROUGH FILTERS

SASKATOON FILTRATION PLANT A

GENERAL PLAN



SASKATOON FILTRATION PLANT B



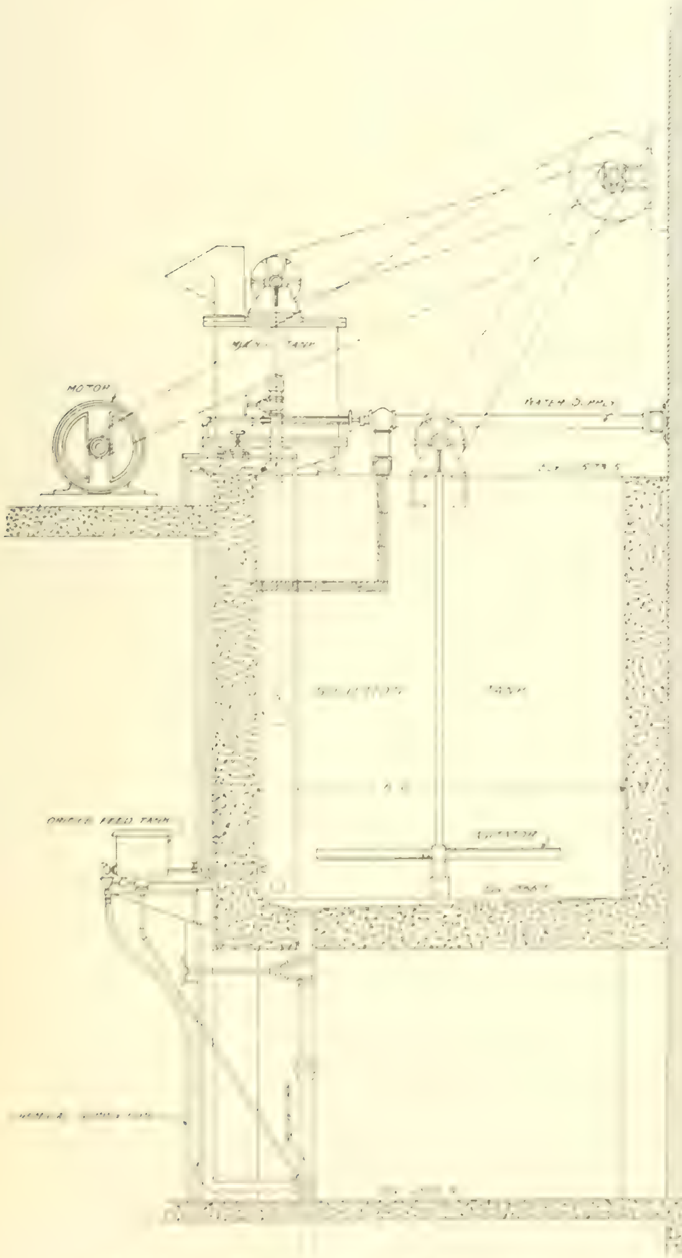
PLAN OF FILTERS

bibb for drawing samples of the wash water during the washing process, also for taking samples of the filtered water at any time while the filter is in operation.

In the laboratory equipment is included a test basin having properly marked bibbs for taking samples of filtered water from each of the six filters, also provision for taking samples of the raw and treated water before and after coagulation. The samples of the water are pumped by the use of a hydraulic lift from the sources of their supply to the bibbs. The hydraulic lifts are actuated by the high pressure of the water in the force main from the high duty pumps. By opening the bibbs on the operating tables and test basin, the pressure is released to the hydraulic lifts, which places them in operation.

The chemical feeding plant consists of four concrete solution tanks located in the second storey of the machinery end of the filtration plant; two for the preparation and mixing of sulphate of alumina and two for hypochlorite of lime.

In the sulphate of alumina solution tank the chemical is placed in lump form in wooden dissolving trays and filtered water allowed to spray over the material until it is dissolved and the solution tanks are filled with this liquid. Wooden paddles are driven through the solution by a pair of bevel gears at a slow rate of speed to insure a more finely graded solution.



Saskatoon filtration plant. Sectional elevation of chemical solution tank

Unjust Condemnation of Pavements

An illustration of how a bad name is sometimes given to good material by faulty construction due to ignorant or careless officials is given by our contemporary, The Municipal Journal, by a contributor from Pennsylvania. The county commissioners two years ago laid upon one of the county bridges creosoted wood blocks in the following manner: three-inch planks were laid at an angle of about thirty degrees to the line of the bridge, the planks, however, not being of a uniform thickness. Over them was spread a light cover of sand, and on this the blocks were laid at right angles to the traffic. The interstices were filled with sand, and hot pitch was spread over the blocks. According to the specifications, the planks were to have been covered with three-ply tar paper and the tar was to have filled the joints. Neither of these requirements was carried out, nor, it was said, was the tar of the consistency called for. The result is that to-day the blocks are from three to four inches out of line on each side of the bridge, the joints forming arcs pointing in the direction of the traffic; and as there is no division of the driveway the effect is the formation of reversed curves. On account of the loss of the sand filler from the joints, removing the lateral support of the blocks, many of these are split and broken.

Whether this particular bridge has ever been cited as an illustration adverse to wood block paving we do not know, but there are probably similar instances of this and most other kinds of pavement which are quoted by competitors as failure of the material, for which the material itself was in no way to blame. This is one of the reasons why decision as to choice of paving materials should be in the hands of those who are experienced in such matters, and should not be decided by visits to one or two pavements, which visits are in many cases "steered" by advocates of some one material.

A rather novel method of repairing a concrete wall surface damaged by freezing before setting, was successfully used in the case of a retaining wall on the Pennsylvania Railway at South Fork, Pa. The patch has now stood over fifteen months, and is apparently in as good condition as when placed. The faulty concrete was removed by a small hand pick to depths varying from 1 inch to 18 inches. The sound concrete exposed was carefully cleaned. Steel dowels were driven into it at 6-inch intervals, and a light reinforcing mesh attached to the dowels. Forms were then placed for the face of the wall, the concrete thoroughly wetted and the holes filled with mortar.

The use of broken pottery as an aggregate for concrete is mentioned by a writer in Concrete and Constructional Engineering of London. He writes from Alexandria, Egypt, where there has been a large amount of this material, making it easy of access and very economical. He says that immense quantities of it are to be found all over Egypt buried under small hills.

An Important Building Enterprise at St. John, N. B.

DIRECTLY across the mouth of St. John harbor from the point where the Canadian Pacific Railway is erecting its second large grain elevator, The Atlantic Sugar Refineries, Limited, of which Mr. D. Lorne McGibbon was the promoter, has begun the erection of a great sugar refinery. The site is at the extremity of the peninsula on which the main portion of the city is built and, which lies between the eastern and western harbor. The sugar refinery on one side and the two grain elevators on the other will stand as giant sentinels at the entrance to the western harbor.

It is stated that the refinery will cost about two and a half million dollars. The plans are being drawn by an active sugar refiner, Mr. J. F. Stillman, of New York, the recognized head of his profession in the United States, and no expense is being spared in making this the most modern and efficient refinery on the American Continent.

The handling of both the raw sugar and the refined product will be on the Telfer system, and practically automatic, and the height of the building, nine storeys, admits of the operation of the plant on a gravity basis, all of which reduces the cost to the minimum.

The new sugar refinery at St. John, N. B., as it will appear upon completion.

The foundation work is going on rapidly, both day and night shifts being employed, and will be finished by May 1st. The steel plans are now in the hands of the steel companies, and the entire work will be rapidly pushed to completion by May, 1914.

The buildings and their sizes are as follows: pan house—nine storeys high covering a space 72 ft 8 ins. by 137 ft. 8 ins.; filter house—nine storeys, covering a space 96 ft. 2 ins. by 75 ft. 8 ins.; machine shop—three storeys, 50 ft. by 82 ft. 8 ins.; engine and pump house—one storey, 41 ft. 6 ins. by 75 ft. 8 ins.; boiler house—two storeys, 82 ft. 8 ins. by 42 ft. 8 ins.; warehouse—four storeys, 82 ft. by 140 ft. at short end and 182 ft. 8 ins. at the long end.

All the buildings except the warehouse are to be constructed of fireproof material throughout, steel beams and columns, brick enclosure, and the partition walls also of brick. The pan and filter houses and the machine shop will be constructed with extra fireproofing, consisting of two inches of cinder concrete or hollow tile. The floor construction in the different buildings is to be of reinforced concrete slabs on top of steel beams. The floor coverings are to be of granolithic cement, asphalt or maple, according to which is the most suitable for the different departments. The buildings will be equipped with electric elevators, and sanitary plumbing fixtures will be installed in all departments. The roof construction will be the same as for the floors. The refinery, when completed, will have a capacity of 2,000 barrels of sugar a day and will employ about seven hundred men. It is estimated that the plant will require from 150 to 200 tons of coal a day.

Mr. F. H. Anson, of Montreal, is the managing director for the company, and Mr. Henry Holgate, of Montreal, is the engineer. The treasurer is Mr. L. R. Wilson, who has established himself in St. John, so as to be in constant touch with the work.

The work on the foundation is being done by the Foundation Company, Limited, under the general direction of Mr. R. E. Chadwick, who is the company's manager for Eastern Canada, and under the direct superintendence of Mr. John Boucher, of New York. Satisfactory progress is being made. The caissons are being sunk about 30 feet to a good foundation, and it will not be very long before the erection of the steel work will be begun.

The only possible cause of delay in the completion of the refinery would be in getting the steel. This must be of a very much heavier class than that used in ordinary buildings, but the fact that it is not of the class most in demand may make it possible to get portions of it out of stock where the lighter class of steel work would not be so readily available. There may also be some difficulty in getting a sufficient supply of bricks. Cement, however, is plentiful.

St. John's Best Building Year

Work has been begun on the foundation of the new post office at St. John, and the site for the new Bank of British North America is being rapidly cleared. Dredging will be begun at once on the site of the new marine depot. The spring will see work begun on two great warehouses, and all the architects in the city are crowded with work preparing plans for other new buildings. They report that this will be one of the best building years in the history of St. John

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At the Museum for Nature Study and Technique, Munich, there is a concrete block, one metre cube, which has been exposed for fifty years to sea water in a Danish seaport. The block is one of a number used in dock wall construction, and was examined for the recent Dusseldorf Exhibition by direction of the Danish Minister of War. The tests and analyses made show that the concrete is in excellent condition, and it is interesting to note that concrete blocks remain perfectly intact after submersion in sea water for half a century.

Thirty-nine plans were submitted in the competition for a design for the Winnipeg City Hall. The first place goes to Messrs. Clemesha & Portnall, of Regina, who received a prize of $5,000—which will be merged in the commission if the contract is awarded; the second prize of $3,000 is awarded to Messrs. Woodman & Carey, and prizes of $2,000 go to the following: J. D. Atchison, Winnipeg; Hugh G. Jones, Montreal, and Brown & Vallance, Montreal. The adjudicator was Mr. Leonard Stokes, past president of the Royal Institute of British Architects.

Factor of Safety in Reinforced Concrete

Considerations Pointing to the Advisability of Standardizing Methods of Calculating Factors of Safety in Reinforced Concrete Construction

By Robert G. Clark, A. M. Inst. C. E.

THE factor of safety in a reinforced concrete structure has generally been devoted by the ratio of the maximum working strees in the steel to the ultimate strength of the steel. For example, assuming that the working stress is 16,000 lbs. per square inch, and the ultimate strength is 64,000 lbs. per square inch, the factor of safety would be 4 by this theory.

Others, again, take the view that if the steel is stressed beyond the elastic limit the structure has to all intents and purposes failed; and, taking this line of reasoning, the factor of safety is expressed by the ratio of maximum working stress to the elastic limit of the steel. Assuming the working stress at 16,000 lbs. per square inch, and the elastic limit at 45,000 lbs. per square inch, we then have the factor of safety reduced to about 2.75. This, however, is purely a theoretical calculation which deals with the steel only; but in any scientifically designed reinforced work, we know that the concrete shares with the steel an equal responsibility concerning the stability of the structure, so that, before the factor of safety can be accurately determined, it is essential to see that the concrete also has an ample margin for safety. This point is too frequently overlooked.

The designer in the matter of the quality of the steel can safeguard himself by specifying that the Standard Specification must be adhered to, but unfortunately no such standard is available for the concrete. It is true that, so far as the cement is concerned, we have the assistance of the Standard Specification as regards quality; but, in the matter of the quantity of cement, the greatest latitude is allowed when we have mixtures varying from 1 : 4 to 1 : 9 parts of cement to aggregate.

Dealing with the aggregate used for the concrete, this is more or less controlled by the materials available in any given district; and here, again, to make matters worse, much difference of opinion exists as to suitable concrete materials. Very often the selection is left to the contractor, whose natural aim is to get something cheap in order to outstrip his competitors; and, as the designer is generally many miles away, he may not know of this arrangement, and the prejudicial effect it may have upon the factors of safety provided by his elaborate calculations.

In the past, it cannot be denied that the concrete has been more or less overshadowed by the advocates of particular kinds of reinforcing steel; but the concrete in reality needs more attention than the steel, not only because of the reasons stated above, but also for the reason that the lifetime of the structure depends upon the efficient protection of the steel from corrosion. Therefore, as we assume in assessing the factor of safety of the steel that it will not deteriorate, every care must be taken to protect it; and this can be done only by having the concrete composed of the best materials available, carefully graded, and mixed with a generous quantity of the best cement.

It is by no means uncommon for competitors to state their calculated factor of safety; and it is interesting to note that for precisely the same work the factors of safety given by various firms vary from 4 to 9. How the latter figure is arrived at is frequently a mystery, especially in cases where the firm submitting the lowest tender quote the highest safety factor.

It is obvious that something should be done to standardize the method of calculating the factor of safety, and that any method adopted should include due consideration of the strength of the concrete mixtures. It is altogether unfair to fix a limit of working stress on the concrete, unless inquiry is also made into its constituent parts, as the limit may be much too low for some mixtures or too high for others.

In conclusion, it must be pointed out that the actual factor of safety is much above the calculated value if the best materials are used; but it should be remembered that the calculated factor of safety is used only for purposes of comparison. With a good concrete, and steel efficiently protected, the factor of safety increases as time progresses, owing to the fact that the concrete increases in strength with age, and in this respect affords a striking contrast with structural steel, timber, or brickwork, which are at their best when new.—Ferro-Concrete.

The test of a reinforced concrete column 16 ft. long was recently conducted at the testing station of the U. S. Bureau of Standards, at Pittsburgh, Pa. The column was made up of a 1:2:4 concrete, crushed stone being used in the aggregate. The outer diameter of the column was 30 in. and the diameter inside of the helical reinforcement was 27 in. The reinforcement consisted of seven 1 1/16 in. round rods placed vertically and a helix of ½ in. wire with a 3 in. pitch. The column was tested in the 10,000,000 lb. testing machine of the station. The first evidence of failure appeared under a load of 2275 lb. per square inch, when the outer shell of concrete started to spall off. Complete failure occurred under a load of 3400 lb. per square inch. Just before this load was reached the wire helix broke near the top of the column and the vertical reinforcement began to buckle near the top, the whole column eventually bulging 6 in. out of line. The concrete was 25 days old at the time the tests were made.

Although the outlook for the building trade in Montreal is of a decidedly optimistic character, there are two or three obstacles ahead which may considerably modify the programme. Money is very tight, and the banks are getting more and more conservative in the matter of accommodation. Then, too, labor is scarce, and unless there is a speedy return of many foreigners who left for the war, this conditions is likely to continue. Under these circumstances several important projects, some of which have been publicly outlined, are for the moment hung up, and the promoters are waiting to see how matters are likely to shape before going on with the building scheme.

The Repair and Maintenance of Roads

Lack of Business Management the Primary Defect—Systematic Accounting Essential—Importance of Organization and Skilled Supervision*

THE common defect in road repair and maintenance [illegible] lack of business management. The management of road construction is slowly improving but repair and maintenance continue neglected. There is a certain enthusiasm and interest about new work which is entirely lacking for repair and maintenance operations. It is now well recognized, however, that no system of roads will remain a good system unless continuously cared for.

It is necessary to distinguish between repair and maintenance. When a road is finished, traffic and the elements act continuously to deteriorate it and will ultimately destroy it. To oppose such deterioration, maintenance equally continuous is required. If maintenance is neglected the best roads will very soon require repair and longer neglect will even require reconstruction. It has been customary for a long time to classify repair as maintenance. It is a natural mistake in view of the fact that, generally speaking, roads on this continent have not been continuously maintained and therefore if maintenance is referred to, it necessarily signifies repair.

Under the organization which prevails throughout Canada and the United States, town and county roads are largely in charge of local officials elected at short intervals. Road management constitutes, as a rule, only a part of a miscellaneous list of duties. Consequently local officials are not elected because of their skill in road making. The typical road official has abundant confidence in his ability and usually proceeds to try out his ideas at the expense of the community. He has his own definition of gravel, crown, grade, etc., and usually has spent considerable money before he is willing to seek advice; and then it is time for electing a new man. Now any system in business where an executive officer was dismissed as fast as he learned his duties would be unhesitatingly condemned. Why do we continue to use such a system of our highways?

The difficulty is largely because the local civil unit for highway purposes is too small. Too small because the annual appropriations for highways do not warrant the employment of skilled supervision; too small because with the permanent practice of rotation in office the annual appropriation is handled by each official as his appropriation without reference to what has preceded or what is to follow. Too small because the experience in road construction and maintenance does not cover a wide enough range to supply information which already exists beyond the borders of the local community. The remedy for this condition, which so universally prevails, is co-operation in some of its various forms. A possible form of co-operation is for townships to collectively organize road districts and hire a salaried road engineer. Another possible form is to delegate more authority over local roads to county officials and to require a high class county engineer. A still more effective form is to invite co-operation from the state or province, even in the matters of township roads, as well as in county roads and inter-county roads. It has been done in the State of New York.

More Centralization

You will observe that all of these methods suggested involve nore centralization in the matter of roads. If there is objection to such centralization, the answer must be that there must then continue a "road problem," for an actual study of the scant records that have been kept on the cost and method of earth road work always reveals the startling fact that enormous sums of money have already been spent under the old system without visible improvement in the roads. I do not hesitate to condemn the use of statute labor upon highways. It has never proved effective. There are several fundamental objection to its use. First, under the statute labor system, work upon the roads cannot be, in any sense, continuous. Neither can it be applied "in point of time." Second, the attitude of freemen toward such work is careless and indifferent and the days of working out the taxes are too often regarded as more or less of a jollification period. Statute labor is not economy even for those who advocate it strongly. For those who advocate it strongly are the residents who see in the custom an opportunity to avoid cash payments and to discharge a duty to the community with a minimum of effort. Now the dwellers along the road are the ones to use the roads, and in proportion as the repair and maintenance of their roads is poor, so is the transportation burden per ton mile of useful produce increased. Those who advocate statute labor in preference to cash taxes simply shift the payment of a road tax to the payment of a mud tax. The road tax is a definite sum of cash the mud tax has the never-ending invisible burden on the cost of hauling.

A Typical County Road System

Let us consider then the repair and maintenance of a typical well organized county road system. In the first place, there should be a map of the county showing plainly all the roads within its borders. These roads should be classified. A possible classification is market roads, through roads and neighborhood roads. Necessarily many market roads will also be through roads and usually every through road is in part a market road. When the roads have been classified according to their service, there should be indicated the nature of construction on the already improved portions in each class. By consulting records, the average annual appropriations for all road and bridge purposes for a series of years nay be determined. It will usually be found that some of this money has been spent for the new work, but that a large percentage of it must go for annual repairs. The County Highway Engineer or other Highway Engineer in charge of the road system must then adopt a financial plan not for one or two years, but such a plan as will, within a series of years, result in a general betterment of the highways under his jurisdiction. A certain large percentage of the roads will receive a minimum of expenditure proportioned according to their importance. These roads will many of them, be neighborhood roads which serve, in many instances, but one or two families. A plan of improvement system established for all improved roads and especially for the important roads which must wait for improvement.

The order of improvement to the relatively small percentage of most used roads should be definitely determined and the type of improvement should be carefully planned. In making such plans, it must be understood that the first mile of any highway radiating from a market center receives an annual traffic many times greater than a mile of the same road which is six or seven miles away from the market. Therefore, the type of improved surface adopted near the town must necessarily be more expensive than that adopted on the outlying mileage. A great deal of permanent improvement may be brought about on earth roads by the expenditure of the money which is usually classified under annual repairs. The engineer should first determine the existing profile of such roads and establish a grade line toward which some work may be done each season. The necessary improvement of the culverts such as replacing wooden and other cheap construction by more durable construction such as concrete, should be planned so that some permanent piece of work may be done each year and the whole effort should be to produce ultimately a road which may be adapted to this service and which shall require low annual repair and maintenance charge. You must see that no such scheme of work can be planned and carried out by any road official who sees only the expenditures of one year ahead.

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* By Dr. L. I. Hewes, Director, Maintenance Division Office of Pub- [illegible]

Systematic Highway Accounts

To get a little nearer to details, there must be begun a systematic set of highway accounts. All operations of repair and maintenance, as well as construction, should be classified as grading, ditching, repairing culverts, dragging, etc., and the unit costs of the various items must be obtainable from the records. To accomplish such a result, distributing tables may be printed on the backs of warrants and vouchers for labor paid. A great defect in maintenance and in repair has been the unintelligent management of materials and machinery. If a macadam road is to be maintained, there must be a supply of No. 2 stone stacked in considerable quantity at intervals along the road. The hauling of this material should be done at the most economical season of the year and it should be continuously available for small repairs. The same applies to gravel. A great many roads may be constructed successfully and maintained as gravel roads with good results. For this purpose the location of the sources of supply of gravel and gravel pits should be plotted on the road map and a record of the quantity in each pit be kept. Very frequently gravel is hauled necessarily great distances for various insufficient reasons. Too often the owner of the gravel pit is also managing some of the roads and may prefer to haul a mile or two from his pit when there exists a supply of good gravel within a quarter of a mile of his job. There is frequently, however, good gravel handy to work but which has never been discovered or developed. It will pay to make a most careful investigation of the source of gravel supply along every road.

Repair of Earth Roads

With reference to the repair of earth roads, the custom of scraping sod and refuse of all kinds into the road centre with a scraping grader cannot be too severely condemned. It is a universal cause of bad roads and waste of highway funds. In repairing an earth road with a scraping grader, the sod may first be scraped off and carted away or the sod may be raked off or picked out with forks and carted away, but never should sod or rotten leaves or manure or any organic substance be placed on the road. The operations of the road grader have been positively damaging in some cases. Many country roads have gutters that are too far from the travelled way and the road supervisor runs the scraping grader a little outside of the wheel tracks to form a new gutter which wanders in and out and up and down and has no outlet. The cost of operating a scraping grader with from two to eight horses attached is very great and unless very effectively managed is a source of tremendous waste, Where new gutters must be formed, lines must be run before work is commenced and broad shallow outlets should be constructed through the turf at all low points and all intermediate points on hillsides. Frequently the repair operations with a road grader can best be accomplished by scraping old material off the road toward the gutter and carting it entirely away. A great defect in most country roads is a high shoulder just outside the wheel track. The road grader can be used effectively to lower the shoulder by beginning at the wheel track and working in successive trips toward the gutter. The earth can then be moved to the centre of the road more quickly and without moving a constantly increasing mass. Very frequently the blade of the road scraper is run too deep at the gutter and not deep enough upon the shoulder.

When an earth road has been put in repair, it can be maintained by the road drag. The original form of the road drag was a split-log drag made from the split halves of a six to eight foot log, six to eight inches in diameter. The two halves of the log are placed face forward and are set two and a half feet apart and at an angle of 45 degrees to the axis of the road. They are suitably braced and supplied with double-trees. In using the split-log drag, two horses are usually needed. Dragging begins at the outside edge or the gutter line of the earth road and proceeds toward the centre. The effect of the drag is to pair off ruts and move a small quantity of earth toward the centre of the road. It also has the capacity to puddle the surface material and form more or less impervious layers which prevent moisture from soaking into the road bed. To drag a road twenty-four feet wide will require three round trips. A team of horses can draw the drag in ten hours about twenty-four miles, so that with three round trips, about four miles of road can be dragged in a day. This is probably the maximum. On steep grades or with unfavorable condi- four miles basis, depends on the price of a man and team. performance will be less. The minimum cost, figured on a four mile basis depends on the price of a man and team, At $4 a day, a complete dragging for three round trips is $1 per mile. In the experimental work by the United States Office of Public Roads in Alexandria County, Virginia, the cost of dragging has been about $1.25 per mile of three round trips.

The Dragging System

The first year of dragging an earth road will require a greater number of trips than in subsequent years. Possibly twenty-four draggings will be required. As the road gets harder under continued dragging and traffic, fewer trips are needed. Important problems to determine immediately are how to establish the dragging system. Probably the best way will be, for the present, for road officials to contract with men who live along roads to drag sections from two to four miles in length. The dragging should be done after every rain and the section man may be required to fill out and forward to the supervisor a post card for each day of dragging. As time goes on, it may be possible for many communities to combine the road patrol and dragging system. This will require the continuous employment of men for probably seven months in the year. If they are paid $45 per month with the understanding that they are to do all dragging, when necessary, the annual cost will be $31.50 per mile on a ten-mile section. This is not an excessive cost per mile. It would no doubt pay to establish such a system in those counties which are spending around $40 per mile on any considerable mileage in the community. The presence of the patrolman, during storms to prevent erosion and keep drainage in working order is a great permanent benefit to the road. In the experiment by the United States Office of Public Roads, in [illegible] 43 per cent. of the patrolman's time was devoted to repairing, cleaning and improving [illegible] per cent. to dragging. Whatever [illegible] of continuous maintenance is adopted and the continuous main-

[illegible] in the [illegible] system, there must be competent inspec- [illegible] duly appointed the inspector.

In the countries of Europe, the road men are frequently supplied with written instructions covering the slightest detail of their work. There is no reason why such a system could not be adopted on this continent. There is need for written instructions covering a great variety of details. For example, the care of the road at driveway entrances, particularly on hill-sides, is extremely imperative to prevent wash from adjacent lands. This is also true of road intersections.

Maintenance Methods

With reference to the method of maintenance of macadam, gravel and bituminous macadam roads, there is much to be said. Written instruction should be issued covering all such points as the selection of stone, the preparation of worn holes and ruts to receive repair material, sweeping, scouring and picking up of the old road, etc. Wherever a roller is present there should be instructions to roll all macadam roads in the spring as soon as the frost is out. The management of the hauling of gravel and broken stone, the balancing of men and teams, offers a great opportunity for economy and detailed instructions on such matters are not superfluous.

It is scarcely necessary to add to what has been said above that the repair and maintenance of our highways is a business which requires trained men for its management and skilled workmen for its performance. There is no need to argue and waste oratory over the road question longer. We know it needs business management and we know that it costs an excessive amount of money under the old system. Furthermore, we know that the roads do continue poor. Happily it has been found that all road work responds amazingly to organization and skilled supervision, nor it is necessary for a general election or over-hauling of official positions to make a beginning in the improvement of repair and maintenance operations upon our highways.

The Canadian Railroad Development

Plans are now prepared for the Canadian Northern Railway terminals at Port Mann, B. C.

Preliminary work will start shortly on the terminal of the Hudson Bay Railway at Le Pas, on the south side of the Saskatchewan River.

The Canadian Pacific Railway Company has let a contract to Mr. W. P. Tierney, of Vancouver, for the construction of the standard gauge line on the Caslo and Slocan Railway. Work will be commenced shortly.

According to reports from St. John, the C. P. R. will spend a million and a half in that city and vicinity during the coming season. It is stated that the largest single item to be spent is one of about $630,000 towards the cost of the new grain elevator at West St. John, its power house, yard and track facilities in connection with it. The next in size is the appropriation for bridges and culverts, which includes the replacing of some large bridges and renewals and repairs for many smaller ones. A large amount will be spent in relaying rails for 115 miles of track. The cost of the new erecting and machine shops at McAdam Junction is included, and runs into six figures. Another interesting item is the completion of the automatic block system, which is being established between St. John and Vanceboro'. The blocks will prevent two trains entering the same section at the same time, and will thus ensure safety from collisions.

Contracts for the double-tracking of 165 miles of C. P. R. lines, of which 135 miles form part of the Lake Superior Division, and 30 miles are situated in the Ontario Division, immediately west of Toronto, were awarded recently. The contracts cover the grading, bridge and culvert work, and steel laying, and the total cost of the work will be about $5,000,000. The various contracts and the successful tenderers are as follows: Lake Superior Division, Cartier subdivision, 29 miles, Cook Construction Company, Sudbury; Chapleau sub-division, 13 miles, Dominion Construction Company, Toronto; White River sub-division, 33 miles, Dominion Construction Company; Schrieber sub-division, 13 miles, Dominion Construction Company; Schrieber sub-division, 22 miles, Chambers, McQuaig, McCaffrey & Cochrane; Nipigon sub-division, 25 miles, Dominion Construction Company. Ontario Division—London sub-division, 30 miles, from Guelph Junction east to Islington, Jones & Girouard, Ottawa.

Extensive changes are expected to be made on the Grand Trunk's central station at Ottawa. The new improvements include a waiting room, warehouse and custom office. A new feature is a class room for railway employees.

Publications Received

The Practical Railway Spiral, by L. C. Jordan, Principal of the Civil Engineering Department of the Heffley Institute, Brooklyn; published by D. Van Nostrand Company, New York; price $1.50. This treatise is based upon information supplied by the chief engineers of all the principal United States and Canadian railroads. Its purpose is to modify the theory and to eliminate the existing inconsistencies of spiral curves. "The Practical Railway Spiral" has been chosen as the title on account of its being the most appropriate name for a curve easement whose principles have been founded upon the actual requirements of such a curve as dictated by the demands of location, maintenance, and operation.

American Civil Engineers' Pocket Book, second edition; Editor-in-Chief, Mansfield Merriman; publishers, Jno. Wiley & Sons, New York, and Renouf Publishing Company, Montreal; price $5 net. The first edition of this handbook, prepared two years ago under the supervision of Professor Merriman, was most favorably received by the engineering profession. In the second edition certain defects have been remedied and a number of useful innovations made, although the bulk of the text remains unaltered. It is of interest to note that this edition contains a chapter on Highways and Streets, by Professor A. H. Blanchard, Columbia University, who has been a frequent contributor to the Contract Record. There is also a new chapter on Thermo-Dynamics and Electricity, by Professor G. A. Goodenough and F. M. Farmer. The various sections are edited by men of international prominence in the respective fields. For instance, Section 10, devoted to water supply, sewerage and irrigation, is by Mr. Allen Hazen, of New York; Section 6, on masonry, foundations and earth work, is by Professor Ira O. Baker, of the University of Illinois. Eight new pages are added in Section 2 to the chapter on earthwork computations. Section 3 is devoted entirely to steam and electric railroads and has seven pages of new matter. Many other changes have been made with a view to the correction of ambiguities and the supplying of deficiencies.

The 1913 edition of "5,000 Facts About Canada," compiled by Mr. Frank Yeigh, contains a host of information concerning every phase of the Dominion's development. The facts are under general, provincial and city headings. Not the least interesting items are those recording railway construction. At the end of June last year Canada's railway mileage, including tracks and sidings, totalled 34,629. This is double the total of twenty years ago. At Confederation, Canada's railway mileage was 2,278. The capital invested in our railways is $1,588,937,526.

Trade Organization at the Capital

The Ottawa Builders' Exchange, Its History and Personnel— A Vigorous Association that is Aiming at Practical Benefits

THE movement looking to the organization of the present Builders' Exchange of the city of Ottawa, was commenced about twenty-seven years ago, when the Brick and Masons' Association was formed. At that time the moving spirit in the promoting and carrying on of the work was Mr. R. Crain, who was assisted by Mr. James Matthews, Mr. R. Lester and Mr. McCullough, while Mr. Bennett filled the office of secretary.

For several years the association was not very flourishing, and about 1899 and 1900 it became practically defunct. Force of circumstances, however, called it back to life in 1900. Then occurred the great fire in Ottawa, which was succeeded by innumerable strikes and the formation of labor unions. To solve the problems arising out of this situation, the association was re-organized and was of great help in tiding over a difficult time in the history of the labor world.

The Builders' Exchange was not organized under its present name until 1908. The Brick and Masons' Association, acting on the suggestion of the National Association of Builders' Exchanges, passed a resolution re-organizing it under the new designation. At its first meeting the Exchange guaranteed a membership of seventy-five members—at an entrance fee of $20. This money was necessary to set the Exchange on a sound financial basis, providing for rent of rooms, secretary's salary, etc. Mr. George Crain, son of the founder of the original association, was chief promoter of the Exchange, and acted as President during the first three years of its existence. It was mainly through his exertions that the necessary funds were secured.

Mr. Crain, who is now forty-one years of age, started business under his father's supervision at the age of twenty-one. Nineteen years ago he commenced business for himself and has since become a prominent figure among Ottawa's builders. Mr. Lauer, the former secretary of the National Association, Mr. Doran, and Mr. Alexander Garvock, were also instrumental in helping the Exchange to [illegible] a footing at its commencement. The membership during 1908 numbered 124.

In 1911 the office of president was held by Mr. T. L. McFarlane, and in 1912 by Mr. A. G. Marshall. For 1913 Mr. Alexander Christie is President.

The Exchange has always had in view the gaining of some practical benefit for its members. During the first four years of its existence, the members directed their efforts chiefly toward the securing of a uniform contract. This was attained during 1912, and the new contracts are now in use in all the architects' offices.

During 1912 considerable effort was expended in the direction of securing for the building contractor an advantage in buying. Nothing has yet been accomplished along this line, partly because the contractors require a more solid organization, and partly because of difficulties which arose in the course of the negotiations. The matter has not been dropped, however, and it is hoped that future efforts will be more successful.

The Secretary of the Exchange for the first three years was Mr. D. J. McKenzie, manager of the Standard Supply Company, of Ottawa, who was succeeded by Mr. J. S. C. Adamson, a graduate of Ottawa Collegiate Institute and Ontario Normal College. Mr. Adamson resided in Pennsylvania and Texas for six years, and upon his return to Ottawa, in 1907, became associated with his brother in the contracting business.

Mr. W. G. Adamson, who was vice-president of the Exchange last year, commenced business for himself about seven years ago, taking over the business of Mr. J. J. Wallace, which for two years previously he had managed.

Last month the Exchange held their annual meeting, when the following officers were elected: President, Mr Alexander Christie; vice-president, Mr. John Sutherland; 2nd vice-president, Mr. James Ritchie; secretary, Mr. J. S. C. Adamson, [illegible] street, Ottawa; treasurer, Mr. A. [illegible]

Mr. Alex. Christie, President Ottawa Builders' Exchange

Mr. Geo. A. Crain, Past President Ottawa Builders' Exchange

Mr. J. S. C. Adamson, Secretary Ottawa Builders' Exchange

From Saskatchewan's Capital

I[illegible] are reported from Regina. The [illegible] advent of spring like weather [illegible] activity among contractors [illegible] have already commenced in the erection of many large buildings.

[illegible] will be spent by the city of Regina on local improvement works this season. The various by-laws providing for the raising of the funds required have already been approved by the city council and ratepayers. Paving will be one of the big items on the programme, while the waterworks system, power plant, and street railway will require large expenditures. On the street railway system alone, $825,000 will be expended.

The street car service was first inaugurated in 1911. During three months in the spring of that year ten and a half miles of street railway track were laid and in July the street cars were in operation. The first order for cars was placed with the Brusch Electric Company, for an English make of car. Since that time, however, all orders have been placed with Canadian firms and sixteen street cars are now on order. During 1912, three and one-half miles of additional lines were laid, and during the present year it is proposed to extend the railway lines considerably further. The programme of extensions provided for constitutes an additional fourteen miles of trackage, which when completed will make twenty-eight miles of street car lines in service. Among other things it is proposed to materially extend the street car barns.

It is possible that the city may introduce the fourth municipally-owned utility during the year. Investigations will be made with a view to starting a gas plant. It has practically been decided to start such a plant, but the method of generating the gas has not been decided upon. In cases where pavements are being laid, gas mains are being laid at the alleyway intersections, so that it will not be necessary to tear up the paving when the city decides to install gas mains throughout the city.

Proposed hotel at Regina for the G. T. P. Development Company. Architects, Messrs. Ross & MacFarlane, Montreal

The sum of $240,000 will be expended on the construction of extensions to the trunk sewer system. Already over $500,000 has been expended on the trunk sewer system and disposal works, but it is now proposed to extend these mains along Seventh avenue for a distance of almost one mile, and southward, on Toronto street, about one mile. Additional work will be done in the southern section of the city, in the vicinity of the Parliament buildings.

The problem of securing good water for western cities is a hard one, but in the case of Regina this matter has been successfully dealt with. Regina now secures a good supply of water from artesian wells, each of which gives sufficient water for a large-sized town. Sixteen of these are in use, but the growth of the city has been so great that the city now proposes to expend $200,000 in developing new areas of water supply.

An amount of $60,000 will be spent on installing storm sewer mains connecting up with the large 72-inch storm sewer completed recently.

McCallum, Hill & Company's building, Regina. Architects, Messrs Storey & Van Egmond

The demands upon the Regina power plant have been so great during the past year that the present power house has reached its capacity and a new building is proposed at a cost of $425,000.

Additional health and scavenging equipment will cost in the neighborhood of $117,000. A considerable portion of this amount provides for the installation of additional incinerators. Additional road equipment will be purchased at a cost of $22,000.

For a new fire hall and additional fire-fighting apparatus the city will expend $60,000. Chief White has decided on the introduction of more motor equipment, and accordingly provision is made for the purchase of several automobile combination chemical and hose outfits.

The Regina General Hospital has become inadequate for the work, and the city is arranging for extensions to cost $125,000.

The domestic sewer mains will cost in the neighborhood of $630,000; water mains, $420,000; paving, $580,000; concrete sidewalks, $115,000; paving (under by-law) $550,000; and extensions to the Collegiate, $100,000. When these works are completed Regina will be well served with all local improvements and will have more paving than any city of its size in the Dominion.

With one exception, the city of Montreal was the lowest tenderer for all the civic asphalt work in the northern part of the city, the total cost being $200,000, and the civic tenders lower by 10 per cent. than those sent in by outside firms. Mr. Janin, the city engineer, states that it is intended, in the near future, to instal a plant to lay sewers.

Montreal Builders' Exchange

Mr. E. M. Trowern, general secretary of the Retail Merchants' Association of Canada, and secretary of the Ontario Branch, addressed the members of the Builders' Exchange at their noonday luncheon on March 13th. The speech was mainly on the benefits of organization, and the passing of good commercial laws. If, said Mr. Trowern, unsuitable commercial laws were made, men in business were responsible for it. Getting together and making a profit was no crime, and the public gave them no credit for working without profit. The movement he represented had the highest ideals, and was confined to no race, no religion, and no creed, but stood for a square deal for everyone engaged in commercial life. Mr. Trowern referred at length to the builders' supply section of the Retail Merchants' Association and pointed out that the objects of this section might be summed up in the following questions addressed to builders' supply firms: Are you in favor of co-operation with your fellow dealers throughout Canada, having in view the improvement of our trade conditions and the determining of a fair and reasonable selling price for supplies? Are you in favor of endeavoring to have the legitimate dealer, who has an established place of business and who has his capital invested therein, and who pays taxes in the municipality, protected against agents who have no established place of business, who pay no taxes, and who carry no stock, but who take orders and sell direct to our customers? Are you in favor of framers or others forming buying syndicates and buying direct from manufacturers and purchasing their supplies at the same price as the legitimate dealer who carries a stock? Are you in favor of giving manufacturers a fair profit and doing all you can to sell their goods providing they deal fairly and equitably with all those engaged in the legitimate trade? Are you in favor of having a standing committee of Builders' Supplies Dealers chosen from the dealers throughout the Dominion to wait upon and interview manufacturers with a view of taking up our various grievances that arise from time to time? Will you unite with us in membership so that we can carry them out and place our business upon a higher plane?

Mr. J. A. Beaudry, the secretary of the Province of Quebec section of the Association, also spoke, and referred to the need for education of the public in connection with retail merchants' problems. These could only be solved by organization.

Regina Builders' Exchange

The Builders' Exchange recently held their annual meeting and elected officers for the ensuing year. Included among the new officials are some very prominent men and some good hard workers, so that the Exchange may be assured of good results during the year. Mr. J. M. Taylor, of the Northwestern Electric Company, takes premier honors, having been elected president. The other officers appointed are as follows: vice-president, Mr. D. Smith; secretary, Mr. William Whiteford; executive committee, Messrs. H. Potts, George Minkley, A. Young and W. A. Wilson.

A second meeting will be held during the [illegible] at the Builders' Exchange, Winnipeg. On that occasion a number of interesting matters will be taken up, among which will be reports from the annual convention of brick manufacturers at Chicago, which ended on March 8th, and to which a number of the members of the [illegible] [illegible] included W. P. Alsip, J. A. Marion, A. Snyder, and Mr. Stephens. It is expected that the meeting will be marked by the addition of a number of new members.

Brick Manufacturers of Manitoba

The annual meeting of the brick manufacturers of Manitoba was held on February 12th at the Builders' Exchange, Winnipeg. The meeting marked the real beginning of an active organization of an association of brickmakers in Manitoba. While there has been an association for the past two years, its meetings have been of a more or less informal nature, and the organization has been more or less intangible. The organization has now been consolidated and perfected, and it is safe to say that it will take an active part in the affairs of the brick manufacturing industry of Manitoba. The name of the association is The Western Canada Brickmakers' Association.

The meeting held last month was presided over by the president, J. A. Marion, of Couture & Marion, St. Boniface. Mr. Marion has been president of the association since its beginning. The only other officer was the vice-president. Additional officers have now been elected as follows: W. P. Alsip, first vice-president; A. Snyder, Portage la Prairie, second vice-president; A. C. Osborne, Gate City Brick Works, Limited, secretary-treasurer; executive for Portage la Prairie district, A. Snyder, Mr. Stephens (of the Stephens Brick Company), and Mr. Switzer; executive for Winnipeg district, W. P. Alsip, J. A. Marion, and A. C. Osborne. The members of the association to date are: Alsip Brick, Tile and Lumber Company, Winnipeg; Balmoral Brick Company, Balmoral; A. Snyder & Company, Limited, Portage la Prairie; Lac du Bonnet Brick Company, Winnipeg and Lac du Bonnet; A. Dykeman, Lavenham; Learie Pressed Brick Works, Learie; A. M. McCutcheon, Morris; Neepawa Brick Company, Neepawa; Stephens Brick Company, Portage la Prairie; Sydney Brick and Tile Company, Sydney; Couture and Marion, St. Boniface; Virden Brick and Tile Company, Virden; Gate City Brick Works, Limited, Winnipeg; Kelly & Sons, Winnipeg; Winnipeg Pressed Brick Company, Winnipeg; Alsip Sandstone Brick Company, Winnipeg.

Action Against the C. N. R.

Mr. Justice Guerin, Montreal, has given judgment in the case brought by Dame Rainville asking for an injunction against the C. N. R. to restrain them from proceeding with tunnelling under Dame Rainville's house. His lordship found in favor of the plaintiff, but the company immediately applied for a stay of the proceedings on the ground that an injunction would involve enormous losses to the company. Still following up the attack upon the company Dame Rainville has applied for an order to get back possession of whatever portion of the land that has been already encroached upon in the course of the tunnelling operations. The C. N. R. on its side has also taken preliminary steps to have a judicial ruling authorizing it to cut a subterranean passage across Dame Rainville's property. Dame Rainville claims that the company must expropriate, while the C. N. R. declares that it has charter rights of easements under or over any property required for its local terminals. The company is willing to expropriate the land in question, but objects to the plea that Dame Rainville owns the land to the centre of the earth.

About one mile and a half of the heading for the Canadian Northern tunnel has been completed and according to present indications the prediction that it will be completed by the end of this year will be improved upon. The city end of the tunnel has reached a point near Sherbrooke street, while the workers at the Mount Royal City end have reached a point three thousand feet from the tunnel mouth.

Good progress is being made at all three entrances of the tunnel, and it is hoped before long to link up the Maplewood avenue working with the main shaft. The earth removed from the Dorchester street shaft has already built up a fair-

[illegible] street and the excavations from the [illegible] are filling up the old quarry near Maplewood [illegible] At the back of the mountain the earth and stones are being used for road-making in the model city.

Canada Cement Co.'s Annual Meeting

In presiding at the annual meeting of the Canada Cement Company, held in Montreal, Senator W. C. Edwards alluded to the criticism directed against the company, but he said that the directors intended to carry out the policy laid down. They had reduced the price of their product and they would go still further in this direction as the circumstances warranted, for it was the policy of the company to stand by the consumers throughout the Dominion. Speaking of conditions during the past year, Senator Edwards declared that there had never been a time when the company did not have a good surplus of their product on hand, and at no time was the company unable to cope with the public demand. The company, the chairman assured the meeting, would always keep abreast of the times and abreast of the Dominion's requirements of cement. Their company was already in the front rank of the Dominion's industrial concerns, and he believed that the time was not far distant when it would be at the head of the industrial enterprises of the country.

Mr. J. M. Kilbourn, the vice-president, speaking as an experienced cement manufacturer, said that there was probably no industry in the country regarding which so much ignorance was displayed by would-be critics, all thinking that enormous profits were being made, although they knew nothing of the expenses attached to so large a production.

The adoption of the report, as moved by Senator Edwards and seconded by Mr. Kilbourn, was then unanimously carried.

Mr. Frank P. Jones, the general manager, said that the following figures would be of interest, showing the holdings of the company apart from the direct plant. They owned, for instance, 29 box cars, 6 flat cars, 24 steel cars, 17 standard gauge locomotives and 23 miles of railway, and had a storage capacity of 2,535,000 barrels of cement. They paid last year taxes to the amount of $47,125, owned 7,338 acres of land, and leased 3,591 acres more. The company owned 206 houses and paid to the transportation companies no less a sum of money than $3,466,066.42 for freight.

The following officers were elected: Hon. W. S. Edwards, Hon. Robt. Mackay, Hon. Geo. A. Cox, Messrs. J. M. Kilbourn, W. H. E. Bravender, C. C. Ballantyne, G. E. Drummond, R. W. Kelley, W. R. Warren, F. P. Jones, E. M. Young, Farquhar Robertson, Denis Murphy, Wm. McMaster and H. L. Doble. The new directors are Messrs. Farquhar Robertson and Wm. McMaster.

The construction of the fifteen-storey Weart office building will be commenced in Vancouver next month. The structure will have a frontage of 78 feet on Hastings street and will extend back 120 feet along Richards street. Steel frame, bedrock foundations, fireproof construction throughout and deep waterproof basements and sub-basements are features of the building. The three lower floors are finished in terra cotta over a highly polished granite base. The eight storeys above are faced with pressed brick, and the four upper storeys with terra cotta. The walls and floors of the main entrance are finished with marble and trimmed with bronze. The ceiling is beamed and panelled with oak. Thirty offices are laid out on each of the upper floors with clothes closets, hot and cold water, electrical fixtures, private vaults and battleship linoleum on the floors. The corridors will be floored with terrazo and bordered with marble. Five high-speed elevators will accommodate the passenger service. The cost of the buildings is placed at $600,000.

Mainly Constructional

The News in Brief—From Coast to Coast

Building permits granted in Toronto for the first half of March amounted to over $875,000.

The detailed plans for the new viaduct at Toronto are expected to be completed within the next few days.

The Massey Harris Company will shortly erect a large warehouse and office building at Swift Current, Sask.

The city of Toronto recently refused to prohibit the use of vitrified glazed tile pipe for inside underground drains.

Great building activity is expected in North Vancouver during the coming season, permits for dwellings being particularly numerous.

The provincial legislature of New Brunswick has decided to assist the Norton Griffiths Company in establishing a shipbuilding plant at St. John.

A Union of Municipalities for the province of Quebec has been organized in Montreal. The association will deal, among other subjects, with good roads.

The firm of Brett, Gillies and Moyse, have commenced business as dealers in building supplies, specializing in rock asphalt mastic, at the New Birks Building, Montreal.

A feature of the building activity in Winnipeg is the large number of churches of all denominations which are at present under construction or shortly to be erected.

The citizens of London, Ont., are incensed at the disgraceful state of the roads there and it has been decided that a large sum must be spent on their improvement

The city of Regina will spend over $130,000 for street railway work this year and has already awarded a big contract for steel to The United States Steel Products Company.

The city of Vancouver is planning for a great summer exhibition in 1915. The exhibition grounds at Hastings Park will be enlarged and splendid buildings will be constructed.

Their Majesties the King and Queen recently opened a new $20,000,000 reservoir at Chingford, Eng. The area of this reservoir is 416 acres, with four and a half miles of embankment.

Great building activity is going on at Oshawa, Ont. Many of the factories there are adding to their plants. The Government is preparing to start the expenditure of $50,000 for harbor improvements.

City Engineer Rust, of Victoria, has recommended to the City Council that a bascule type of bridge would be more suitable than a lift bridge to connect Johnson street with the former Indian Reserve.

The proposed widening of Yonge street, Toronto, from Bloor street north to the city limits, would cost in the neighborhood of $20,000,000. The matter has been referred back to another meeting of the Council.

The Dominion Government have made a grant of $50,000 towards the building of a viaduct across the canal at Pretoria avenue, Ottawa. The total cost of the bridge will be about $30,000, the city to pay the balance.

The Black Building Supply Company, Limited, have been awarded the contract for supplying the Northwestern Architectural Terra Cotta for the new Ryrie Building. Messrs. Elgie & Page are the general contractors.

Work will be started shortly on the grain elevator for the Quebec Harbor Commission and if the necessary material can be delivered without delay, the completion of the elevator will be hurried on as much as possible.

The recent elections for the Engineering Society of the University of Toronto resulted as follows: President, F. C. Mechin; first vice-president, F. S. Rutherford; second vice-president, R. E. Laidlaw.

Litigation between the C. N. R. and Dame Rainville over the construction of the Mount Royal tunnel beneath the latter's house has been suspended by mutual agreement. In the meantime the work will be proceeded with.

A noteworthy contract awarded recently at St. John, N.B., was that for the new Chamber of Commerce Building. The successful contractors were Messrs. A. C. Stewart & Company. The work involves the expenditure of some $280,000.

A contract for improving the harbors of Vancouver and Victoria and building a drydock, at the cost of $20,000,000 will be given to Sir John Jackson, the eminent English public works contractor. The new drydock will be one of the largest on the continent.

According to Mr. J. T. Davis, of the firm of N. R. & J. T. Davis, contractors, all the stone work of the main and anchor piers of the Quebec side of the Quebec Bridge will be completed by the middle of June. On the Levis side of the great structure, everything is ready for the granite.

The General Manufacturers' Agencies, Limited, 515 New Birks Building, Montreal, and 34 Yonge street, Toronto, are now handling the line of steam, water and air specialties in Eastern Canada for Messrs. Kieley & Mueller, New York. It is of interest to note that the latter firm has adopted the trade mark "Kilemul," which now appears on the castings of all their specialties.

The Board of Control of Winnipeg have written to the Manitoba Architects' Association asking them to name three architects competent to act as consulting engineers for the designing of the general character of the buildings for the next exhibition grounds. The board will make its selection of the architects from the three named by the Architects' Association.

City Engineer Grimmer, of Medicine Hat, has submitted the following estimate of expenditures:—Gas main extensions, $125,000; water main extensions, $150,000; sewer extensions, $250,000. These figures do not include the amount that is being spent in the new water and electric light plant up the river, together with a reservoir, which will cost over $400,000 when completed. Mr. Grimmer expects to have the plant read for use, with the exception of the reservoir, in May, when Medicine Hat will have a water system large enough for a city of 50,000, and built in units, so that it can be added to at any time in the future, as the city grows.

In addition to the A. C. Johnson and G. O. Devenish buildings at Calgary, to be erected at a cost of about $150,000 each, it is practically assured that work will be resumed this spring on Col. Walker's theatre and office building. Foundations for this building are already laid on Seventh avenue west, opposite the Alberta Loan building. This structure is estimated to cost about $400,000. Messrs. Lang & Major, the architects, announce that they also expect to proceed with the Harvetta block, for which plans were prepared some time ago. This building will also cost about $400,000. A third large structure, to cost in the neighborhood of half a million, is that proposed for the Beveridge interests.

Winnipeg's new building by-law, which is now in the hands of the printers, is by far the most complete code which has ever covered the building operations of that city. Until the passage of this by-law by the city council, the regulations have been found scattered through the motions made by councils for the past several years. The present by-law, however, when in book form will cover all that is required in the erection of a building except regulations concerning the interior fittings connected with electric wiring, plumbing, etc., and an effort is being made to have these regulations compiled and placed within the same covers, so that builders, architects, and all interested in the by-law will have a complete and ready reference.

The J. J. McLean Lime Company, of Young, Sask., are doubling the capacity of their plant, and contracts are now being given in connection with it. Up to the present the company has confined its attention to Saskatoon, but with the improved facilities it is expected that they will be able to supply a larger field.

Mr. C. O. Foss, C.E., District Engineer, G.T.P., New Brunswick

The District Engineer of the New Brunswick section of the Grand Trunk Pacific, 256 miles in length, is Mr. C. O. Foss, who has had experience in engineering in several of the American states, as well as in Nova Scotia and New Brunswick. Mr. Foss was born in 1852 at Wentworth, N.H. On leaving college in March, 1872, he entered the office of Mr. Chas. C. Lund, C.E., of Concord, N.H., and was employed by the latter in general engineering work until 1878, when he became a partner in the firm of Lund & Foss, civil engineers. Upon Mr. Lund's death in 1880, Mr. Foss took F. A. Merrill into the firm, which became Foss & Merrill. For three years, 1880-81-82, Mr. Foss was engaged in railway construction in Texas, Iowa and Missouri. In 1883 he went to Nova Scotia as engineer of the Nova Scotia Central Railway, and was engaged in the construction and operation of that road until September, 1904, although during that period he was also able to engage in other engineering work, such as putting in water works systems. In September, 1904, he went to New Brunswick, as chief of Party No. 4 on preliminary surveys for the new Transcontinental Railway. In February of the following year he was made assistant District Engineer, and given charge of all surveys and location of the line through New Brunswick. In [illegible] he was appointed District Engineer, in succession to Mr. Guy C. Dunn. Mr. Foss is a member of the Canadian Society of Civil Engineers and has made a wide circle of friends in Nova Scotia and New Brunswick. His present home is in the city of St. John.

Mr. C. O. Foss

Personal Mention

Mr. [illegible], Secretary of the Toronto Builders' [illegible] has [illegible] his resignation.

Mr. F. N. Norman, Manager of The Canadian Fairbanks-Morse Company, Limited, of Toronto, is on a trip to England.

[illegible] Minister of Public Works, Quebec, has promised to build a steel bridge over the River Fourche-du-Pain, P.Q.

Mr. August Castello, Chief Engineer of the Grand Trunk power plant at Stratford, Ont., has been appointed chief engineer of the Grand Trunk central station at Ottawa.

Messrs. Brittain, Crane & Robertson, Managers of the Winnipeg, Saskatoon and Calgary branch houses respectively of The Canadian Fairbanks-Morse Company, Limited, have been down east for a few days on business.

Mr. J. G. Seyfried, structural engineer, G. T. R., who has left to join the staff of the Canada Foundry Company, Toronto, was recently presented with a travelling bag, the presentation being made by Mr. H. B. Stafford, the chief engineer.

Mr. J. A. Kent, of Toronto, has been elected president of The Canadian National Exhibition Association. Messrs. Joseph Oliver and Mr. Noel Marshal, both of Toronto, are vice-presidents. Mr. Geo. H. Gooderham, M.P.P., is honorary president.

Mr. Philip J. Turner, F.R.I.B.A., 116 Board of Trade Building, Montreal, has taken into partnership Mr. Wm. Carless, Lic.R.I.B.A., formerly in practice at Dundee, Scotland, and at one time Chief Assistant to Sir Brumwell Thomas, architect for the Belfast City Hall.

Mr. A. Kastella, chief engineer of the Grand Trunk power plant at Stratford, has been appointed chief engineer of the Grand Trunk Central station and Chateau Laurier at Ottawa. Mr. Kastella will have charge of the lighting, heating and equipment of the terminal and hotel.

Mr. C. S. Burgess, A.R.I.B.A., who was a special lecturer in architecture at McGill, has been appointed professor of architecture at the University of Alberta. Prior to leaving for Edmonton he was presented by the St. James Literary Society, Montreal, with a travelling bag. Mr. Burgess was lately in private practice.

The Canadian Pacific Railway has created a new office—that of division surveyor. Mr. A. P. Walker is appointed division surveyor of the Ontario Division, with office at Toronto; Mr. G. E. Fiset takes over similar work on the Eastern Division; and Mr. W. A. Sibbett will be in charge of the Superior Division, with office at North Bay.

Mr. F. Rankin, who, as announced in a previous issue, succeeds Mr. W. W. Hay as Secretary of the Calgary Builders' Exchange, was formerly connected with the Department of Natural Resources of the C. P. R., under the management of Mr. J. S. Dennis. Previously to that he studied law with Messrs. Lougheed, Bennett & Company, [illegible]

Mr. Peter S. Archibald, formerly chief engineer of the Intercolonial Railway, died last week after a brief illness, aged 65 years. He joined Sir Sanford Fleming's Intercolonial construction staff in 1876, and was assistant and resident engineer under him during its construction. He was chief engineer of the I. C. R. from 1879 until 1898, since when he has been in private life as a consulting engineer.

Mr. Frank Portnall, of Regina, is a partner in the architectural firm of Clemesha & Portnall, which submitted the successful design for the Winnipeg City Hall. Mr. Portnall was born at Shanklin, in the Isle of Wight, in 1886, and received his early professional training in London. Coming to Canada in 1907, he entered the office of Messrs. Darling & Pearson, for whom he subsequently went to Regina to open an office. He has been associated with Mr. Clemesha since 1910.

Applications from many parts of the world were received for the position of Controller for the city of Westmount, but the Council have decided to appoint Mr. George W. Thompson, superintendent of the light and power department, as acting controller, at a salary of $5,000 a year. Mr. A. F. Bell, assistant city clerk, has been appointed Secretary-Treasurer in place of Mr. A. D. Shibley, who has resigned the office of clerk. The salary of Mr. Archibald Currie, the city engineer, has been increased by $500 in view of his efficient services.

Mr. H. M. Morrow, formerly Assistant Manager of the Asbestos Corporation of Canada, is now in the employ of The Canadian Fairbanks-Morse Company, Limited, at Montreal, and will be associated with the Motor Truck Department. This company has the Canadian agencies of The International Motor Company for the sale of their "Mack" gasoline motor truck, and the Lansden Company of Newark, N.J., for electric trucks. They also have the Canadian agency for the Electric Baggage Trucks and the Elwell-Parker Company of Cleveland.

Mr. F. Chapman Clemesha, of Regina, is the senior member of the firm of Clemesha & Portnall, the successful architects in the competition for a design for Winnipeg's three million dollar new City Hall. Mr. Clemesha was born at Preston, Eng., in 1876. At an early age he began to travel extensively, studying architecture in various European countries and in India. Later he went to the Argentine Republic. Coming to Canada twelve years ago, he spent some time in the provinces and ultimately opened an office at Regina, in which city he has designed some of the finest public and residential buildings. Mr. Clemesha is a Past-President of the Provincial Architectural Society of Saskatchewan, a Licentiate Member of the Royal Institute of British Architects and a Member of the Royal Architectural Institute of Canada.

Mr. J. H. Lauer, the manager of the Marconi Wireless Telegraph Company of Canada, in an interview, stated that three Marconi stations, communicating between Lake Superior and Lake Huron were built last year, and the new station at Sarnia, now under construction, will be in commission at the opening of navigation. This will give a direct through communication from Port Arthur, at the head of Lake Superior, down to Sarnia, at the foot of Lake Huron. It was also the intention of the government to proceed with the construction of stations at Port Stanley, on Lake Erie, and Toronto and Kingston, on Lake Ontario. This would make complete the entire chain of stations from the head of navigation on the Great Lakes to Cape Race, the extreme eastern limit of Newfoundland. At the present time there is through communication between Montreal and Cape Race. The apparatus at the latter point has now a steady radius of between four and five hundred miles, and can reach ships from 1,200 to 1,500 miles east of New York. The average range for the standard set for small ships has a radius of two hundred miles, but liners carry a much more powerful apparatus. Last summer wireless engineers explored the great rugged strip of the Labrador coast and the immense wilderness lying around Hudson Bay, with a view to linking them with the rest of the world by the Marconi system. Further expeditions will continue this work as soon as spring opens up.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies

Information for insertion in these columns is invited from Architects, Contractors, Engineers, etc.

Waterworks, Sewerage and Roadways

Berlin, Ont.

Tenders received by Clerk, A. H. Miller, up to April 3rd for cast iron catch basin covers and manhole castings, concrete tile, sewer pipe. Specifications at office of City Engineer and MacLean Daily Reports, Toronto. W. D. Euler, mayor.

Walks, etc, planned by city council. Tenders received by Clerk, A. H. Miller, up to April 3rd, for laying cement walks, combined concrete curb and gutters and curb irons. Specifications at office of City Engineer and MacLean Daily Reports, Toronto. Mayor, W. D. Euler

Brighton, Ont.

Waterworks supplies. Tenders received by Clerk, T. C. Lockwood, until April 7th for 11,600 ft. 10 in. steel pipe, 21,500 ft. 6 in. steel pipe; 396 ft. 6in. hydrants; 498 6 in. gate valves; 6 10 in. gate valves. Specifications at office of Engineer, T. Aird Murray, 303 Lumsden Building, Toronto. Reeve, R. J. Ross.

Calgary, Alta.

Asphalt paving plant, cost $60,000, planned by city commissioners. Clerk, J. M. Miller. Work will be done by day labor under supervision of City Engineer.

Edmonton, Alta.

Approximately 320,000 sq. ft. of concrete walks planned by City Commissioners. City Engineer, A. J. Latornell. General contractors, the Forest City Paving Company.

Water meters required by city commissioners. Clerk, Chas. E. Cox. Engineer, A. J. Latornell. Specifications at office of Engineer, Rice street and McDougal avenue. Tenders received till April 10th.

Goderich, Ont.

Council will have plans prepared for an extension to the sewage system to the quarters occupied by the numerous summer resorters' cottages; also for new sewers on Norfolk, Wright and Cameron streets. Clerk, L. L. Knox.

Quebec, Que.

The city council. plan laying cement walks and asphalt pavement on Blvd. Langelier. City engineer, W. Baillairge.

Moose Jaw, Sask.

Paving, cost $46,000. Clerk, W. F. Heal. By-law passed to raise money for 9,984 sq. yards of paving.

Regina, Sask.

Waterworks supplies. Supt. waterworks, J. M. Mackey. Specifications at office of Supt. Tenders received by City Commissioners till April 9th. For contract B:—Approximately 77,637 lin. ft. 6 in. cast iron pipe; 7,180 lin. ft. 8 in.; 2,983 lin. ft. 10 in.; 1,140 lin. ft 12 in.; 9,958 lin. ft. 16 in.; 10,941 lin. ft 18 in.; 16,712 lin. ft. 24 in.; 96.92 tons specials. Contract C:—Approximately 105 tons ¾ in. lead pipe; 25 tons 1 in. lead pipe; 4,500 lin. ft. 2 in. galvanized pipe and couplings; 500 lin. ft ¾ in. galvanized pipe and couplings; 1,000 lin. ft. 1 in. black pipe; 123½ tons pig lead; 5 tons braided jute rope. Contract D:—Approximately 150 2 in. brass gate valves; 271 6 in. iron body gate valves; 29 8 in. iron body gate valves; 4 10 in. iron body gate valves; 2 12 in. iron body gate valves; 15 16 in. iron body gate valves; 13 18 in. iron body gate valves; 13 24 in. iron body gate valves; 1 18 in. check valve; 348 valve boxes; 190 6 in. fire hydrants; 10 8 in. fire hydrants. Contract E:—1,750 ¾ in. corporation cocks; 800 1 in. corporation cocks; 1,750 ¾ in. curb cocks; 800 1 in. curb cocks; 300 ¾ in. lead to lead unions; 200 1 in. lead to lead unions; 150 1 in. four way branches; 1,500 No. 2 curb boxes; 200 No. 4 curb boxes; 200 No. 4 curb tops.

St. Thomas, Ont.

Waterworks, cost $105,000, contemplated by city council. Plans have been prepared to lay a 20 in. main, erect a standpipe and put in new boilers at pumping station. Mayor, E. N. Price. Engineer in charge, James A. Bell, City Hall. Commissioner, Geo. K. Crocker.

Waterous, Sask.

Contract T for laying of concrete sidewalks. Specifications, etc., at office of Secretary-treasurer and Engineer. Tenders received by Secretary-Treasurer, F. C. Wright, until April 14th. Reeve, E. Meadows. Engineers, Chipman & Power, Toronto and Winnipeg.

Waterworks and sewers. Contract A for laying water pipes and sewers. Specifications, etc., at offices of Secretary-Treasurer and Engineers. Tenders received by Secretary-Treasurer, F. C. Wright, until April 14th. Reeve, E. Meadows. Engineers, Chipman & Power, Toronto and Winnipeg.

CONTRACTS AWARDED

Edmonton, Alta.

Pavements. Contract for the remaining 150,000 yds. of asphalt paving was awarded to The Worswick Paving Company, Hollywood road, Victoria, B.C. Engineer, A. J. Latornell.

Railroads, Bridges and Wharves

Cote St. Paul, Que.

Improvements to Upper Approach Lock No. 4, Lachine Canal. Tenders received by Secretary, L. K. Jones, Ottawa, Dom. Govt. Dept. of Railways and Canals, until March 31st. Plans, specifications, etc., at office of Chief Engineer [illegible] Dept. Ottawa, Supt. [illegible] Canals, Birks Building, Phillips square, Montreal.

Hull, Que.

Hull Electric Railway Company, Main street, plan extension of railway to Connaught Park race course. Length, [illegible] mile double track, weight of rail, 60 lbs., gauge 4 ft. 8½ in. Engineer in charge, Supt. of H. E. Ry.

Inverness, N.S.

Harbour improvements contemplated by the Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

Leipzig, Sask.

Canadian Pacific Railway Company's location of station on Sec. 17-37-19 W 3 M. at Leipzig, Sask., has been approved.

Montreal, Que.

Canadian Pacific Railway Company has been authorized to construct Forsyth Branch, over and across Moreau, Forsyth, Prefontaine, Dezery, Germain, Darling, Davidson, Cuvellier, Aylwin, Joliette, Chambly, Nicolet and Valois streets, by means of overhead bridges, and to revise existing grade at Forsyth, Davidson and St. Germain streets, all in Hochelago Ward, Montreal, Que.

Nosbonsing, Ont.

Canadian Northern Ontario Railway Company's location of station at Nosbonsing Twp. Ferris, Dist. Nipissing, Ont., at mileage 216.2 from Ottawa, has been approved.

Ottawa, Ont.

Bridge, cost $100,000, Pretoria ave., planned. Mayor, J. A. Ellis. Acting City Engineer, F. C. Askwith, City Hall. Reinforced concrete high level bridge over Rideau Canal. Government have now allowed $50,000 for this work. Five spans, 290 ft. long by 50 ft., concrete substructure, reinforced concrete superstructure.

Point of Foul Ground, N.B.

Dredging, St. John Harbor. Tenders received by Secretary, R. C. Desrochers, Ottawa, Dom. Govt. Dept. of Public Works, until April 2nd, for dredging 35,000 cu. yds. Specifications at Dept., Ottawa, and at office of MacLean Daily Reports, Toronto.

Toronto, Ont.

Tenders received by Clerk until April 4th, for 5 reinforced concrete bridges for [illegible] ronto St., and J. Nign, Esq., Reeve, Almira, Ont. Clerk, C. H. Stiver, Unionville.

Vancouver, B.C.

Bridge, cost $700,000, Pitt River, contemplated by Prov. Govt. Dept. of Public Works. Engineer, J. E. Griffiths, Victoria. Minister, Hon. Thos. Taylor.

The substructure which will cost $200,000 will be built this year.

Willow Point, B.C.
Tenders received by Secretary until April [illegible], for constructing pile wharf, [illegible] ft. long x [illegible] ft. wide. Plans, specifications, etc., at Dept., Ottawa, and at office of [illegible] Worsfold Dist. Engineer, New Westminster, B.C., J. P. Forde, Revelstoke, B.C., and Postmaster at Willow Point, B.C. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa.

Wymark, Sask.
C. P. Rly. Co.'s location of station on N.E. ¼ Sec. 29-13-13 W. 3 M. at Wymark, Sask., has been approved.

CONTRACTS AWARDED

Ft. William, Ont.
Elevator, cost $700,000, River Front, for C. P. Rly. Architects and builders, Barnett & McQueen. Foundations in.

Golden, B.C.
Railway, Windermere and Golden, for C. P. Rly. Director of Work, John Jordon, Golden, B.C. General contractors, Burns & Jordon, Spokane, Wash. For 60 miles Kootenay Central Line. General contractors, Boomer & Hughes, Spokane, 20 miles Kootenay Central Line. About 2,000 men will be employed in over 20 camps.

Public Building, Churches, Schools, etc.

Alberton, Ont.
School, Twp. Ancaster, planned by Trustees, School Sec. No. 15. Secretary, Henry Ferguson, Alberton. Architect, F. W. Warren, 415 King William street east, Hamilton. Stone foundation, pressed brick construction, hot air heating.

Banff, Alta.
School, cost $30,000, planned by Banff School Board. Architects, Lang & Major, Board of Trade, Calgary, are revising plans.

Bulyea, Sask.
School, 2 rooms, brick veneer construction. Plans, specifications, etc., at office of Secretary-Treasurer, S. S. McElroy, who will receive tenders till April 2nd.

Calgary, Alta.
Theatre, 7th ave. east, for Col. Jas. Walker, 35 Lineham Block. Architects, Lang & Major, Board of Trade Bldg. The foundations have been in for some time. Work will likely be proceeded with at once.

The city has decided to establish a testing laboratory at a cost of $12,000, and has engaged Mr. Field as chief, to whom inquiries should be addressed.

The city has decided to submit a bylaw for raising $50,000 for a "Childrens Shelter," the amount to cover price of land and building.

College, cost $100,000, for The English Order of Benedictines (Rev. Father Clarkson). Site of 20 acres in Sec. 24 twp. 24 has been secured and plans will be prepared.

Joiliette, Que.
Alterations and addition to public building. Dom. Govt. Dept. of Public Works. Secretary, R. C. Desrochers, Ottawa. Tenders will be called shortly.

London, Ont.
Addition to church, cost $10,000, for St. Pauls Anglican Cathedral. Rector, Rev. Canon Tucker, Queen's and Park avenues. Architect, John M. Moore, Carling Block. Pressed brick construction, stone trimmings, stone and cement foundation. Plans drawn.

Lunenburg, N.S.
Wooden lighthouse tower at Tanner Island, Lunenburg County. Tenders received by A. Johnston, Deputy Minister of Marine and Fisheries, Ottawa, until April 7th. Plans, etc., at the Dept., Ottawa and Halifax, and post offices Chester, Bridgewater, Liverpool and Lunenburg.

Moose Jaw, Sask.
By-law passed to provide funds for erection of Y. M. C. A. building. Present address 26 Ominca Street West.

Newport, Que., Gaspe Co.
Church, for R. C. Diocese. Architects, Ouellett & Levesque, 115 St. John St., Quebec, are preparing plans. The contract for this building will not be awarded before next June. Stone and Scotch brick construction, interior plaster finish.

North Battleford, Sask.
School, cost $130,000, contemplated by Public School Board. Plans of Architects, Stephenson, Evans & Fillingham, were selected in competition.

Oshawa, Ont.
School for Separate School Board. Architects, Mallory & Thatcher, 31 Queen west, Toronto. Two storeys, stone and brick construction. Plans in progress.

Pt. Dover, Ont.
Addition to school, cost $10,000, contemplated by Board of Education. Secretary, James Sloan. Architect to be chosen. By-law will be voted on April 12th.

Prince Albert, Sask.
Cathedral, cost $150,000, planned for Roman Catholic Diocese. Bishop, Right Rev. Albert Pascal. Architects, Creighton & Crowther, Central avenue. 75 x 162, cement foundation, stone and brick construction. Tenders to be called about April 15th.

St. Thomas, Ont.
Alterations and addition to barracks, cost $6,500, for Salvation Army, 25 St. Catharine street. Architect, Major Miller, Salvation Army Baracks, Toronto. 46 x 20, white brick construction, felt and gravel or patent roofing. Plans drawn.

Sandwich, Ont.
Public school, cost $30,000, contemplated by the Board. Architect not chosen yet. Two storeys, 8 rooms, brick foundation.

Souris, Man.
Fire hall, cost $12,000, First avenue. Architect. C. T. H. Munro. Two stys., 40 x 50, stone foundation, brick construction. Plans in progress.

Toornto, Ont.
Pasturizing building, cost $6,000, for Hospital for Sick Children, College St. Architects, Stevens & Lee, 23 Scott St. Two storeys, 32 x 49, structural steel and brick construction, brick foundation. Plans drawn.

Theatre, cost $7,000, Gerrard street east, for J. G. Vale, 81 Simpson avenue. Architect, P. H. Finney, 79 Adelaide St. east. Two storeys, 25 x 80, structural steel and brick construction, brick foundation. Plans drawn.

Vancouver, B.C.
Seamen's Home, cost $100,000, Alexander street, for the Robert F. Scott Memorial Seamen's Home Building, c/o Architects, Helyer & Archer, 207 Hastings street west. Seven storeys, 50 x 85, reinforced concrete and brick construction. Plans being prepared.

Walkerville, Ont.
The town council contemplate installing steel clad incinerator for garbage disposal, capacity 12 tons daily, cost $12,125. Address, Mayor, R. H. Revell, or Ald. Leishman for further particulars.

Winchester, Ont.
School, cost $9,000, planned by Winchester Continuation School Board. Architect, B. Dillon, King street, Brockville. Tenders received by Sec.-Treas. of Board. Two storeys, cement foundation, shale brick construction.

Winnipeg, Man.
Hospital, cost $70,000. Board of the North Winnipeg Hospital, 462 Burrows avenue. Architect, Paul M. Clemens, 331 Garry street. Address, Secretary of the North Winnipeg Hospital, 467 Burrows avenue, Winnipeg. Plans in progress.

CONTRACTS AWARDED

London, Ont.
School, cost $25,000, Maitland and Cheapside, for St. Michaels R. C. School Board (Father Hanlon). Architects, McBride & Fairgeld, Edge Block. General contractor, John Putherbough, 1002 Wellington street. Two storeys, 90 x 48.

Montreal, Que.
Alterations to school, cost $20,000, Notre Dame De Grace, Royal avenue. Owner, C. T. Fosberry (in trust), Royal avenue. Builders, Finley & Spence, 46 Beaver Hall Hill. General contractor, Wm. Long, 36 Windsor. Extension of 3 storeys, 60 x 80, solid brick, reinforced concrete and structural steel construction, stone and concrete foundation.

Toronto, Ont.
Theatre, Bloor and St. Clarens. S. Bloom & Co., 978 Queen west. Architects, Redmond & Beggs, Kent Building. General contractors, Bell Bros., 39 Howard Park ave. Heating not yet awarded. Plumbing, F. J. Smith, 3 Royce ave.

Business Buildings and Industrial Plants

Brampton, Ont.
Greenhouses for Dale Estate, Brampton. Brick, frame and glass construction. Six houses each 600 ft. long, boilers have been purchased from Canada Foundry Co. Plans in progress.

Calgary, Alta.
Stores and offices, cost $500,000, 2nd street west, for J. S. Mackie, 1st street west. Architect, J. C. Teague, 310 Dominion Block. Ten storeys, 80 x 130, fireproof construction. Tenders are in but contracts have not yet been awarded.

Warehouse, cost $60,000, 4th street west, for Canadian Gen. Elec. Co., 325a 8th avenue west. Architects, Hodgson, Bates & Beattie, Grain Exchange Building. Four storeys, 50 x 30, fireproof, reinforced concrete construction. Plans prepared.

Addition to departmental stores, cost $100,000, for Pryce Jones (Canada) Limited, 12th and 1st street. Architects, Hodgson, Bates & Beattie, Grain Exchange. Will erect 3-storey addition on present building, 200 x 60, reinforced concrete construction.

Hamilton, Ont.

A one storey addition warehouse and factory, for Buntin-Gillies & Company, manufacturers paper and stationery supplies, 69 John street south. Architect, A. W. Peene, Clyde Block. Plans in progress.

Addition to pork packing plant for Armour Packing Company, Chicago, Ill. Manager, Wm. Walker. Firm's architect, Chicago, is preparing plans. Tenders will be called shortly.

Kingston, Ont.

Coal gas plant, cost $60,000, contemplated by the city council. Mayor, T. J. Rigney. Site is being looked for along the water front.

Leamington, Ont.

Cannery, cost $25,000, planned for Gorman Eckert Company, Rectory St., London. Manager, Wm. Gorman. Architect, company's own men. Equipment required. The above cost includes building and equipment. Two storeys, white brick construction.

Magog, Ont.

Bank building, Main street, for Can. Bank of Commerce. Head office, Toronto, Ont. Site has been purchased and plans will be prepared.

Medicine Hat, Alta.

The Alberta Clay Products Company contemplate making extensions to their plant.

Montreal, Que.

Store and flats, cost $21,000, Mance and Fairmont, for S. Arnovity, 1925 Esplanade. Architect, Arthur St. Louis, 80 St. Gabriel. Three storeys, 51 x 101, frame and pressed brick construction, cement foundation. Plans drawn.

Factory and work shop, cost $4,000, for Canadian Glass Manufacturing Co., Ltd., Wellington street. Architect, Etmond Herdt, National Bridge Company. Engineers Jos. Faille and National Bridge Co. Two storeys, steam heating. Excavating done.

Nelson, B.C.

Addition to warehouse, cost $20,000, for the Wood Vallance Hardware Company. Manager, G. W. McBride. Two storeys, 50 x 55, brick construction. Plans in progress.

Port Dalhousie, Ont.

Factory, cost $30,000, for Pt. Dalhousie Canning Co. Architects Watt & Blackwell, Lister Building, Hamilton. General contractors, Newman Bros., 15 St. Paul street, St. Catharines, will sublet contracts. Three storeys, concrete construction, concrete floors, felt and gravel roofing.

Stratford, Ont.

Factory, cost $15,000, planned for B. F. Kastner Company. By-law passed by ratepayers March 9th.

Sherbrooke, Que.

Extension to office of Canadian Ingersoll Rand Company, Sherbrooke. Architect, H. G. James, Whiting Block. Mechanical engineer, H. V. Haight, c/o Company. Two storeys. Plans in progress.

Toronto, Ont.

Warehouse, cost $37,000, Dundas, for C. A. Ward 300 College street. Structural engineers, James, London & Hertzburg, 57 Adelaide east. Owner will call for tenders shortly. Five stys., 47 x 130, reinforced concrete construction, cement foundation.

Store and apartments, cost $8,000, Dundas and St. Clarens, for Geo. Kerr, Confederation Life. Architects, Symons & Rea, 15 Toronto street. Three stys., 32 x 99, structural steel and brick construction, brick foundation. Plans drawn.

Vancouver, B.C.

Stores and apartments, Pender street west, for Barrett & Deane, c/o architect, Wm. Frederick Gardiner, 347 Pender St. W. Four storeys and basement, 75 x 120, structural steel, brick and mill construction, stone trimming. Tenders received by architect.

Waterloo, Ont.

Bottling warehouse, cost $25,000, for Kuntz Brewing Company, William St. Manager, A. Bauer. Tenders received until April 1st. White brick construction, stone and cement foundation.

West Lorne, Ont.

Addition to cannery, cost $6,000, for Dominion Canners, Ltd., Head Office, Aylmer, Ont. Two storeys, 25 x 40, brick construction. Plans in progress.

CONTRACTS AWARDED

Calgary, Alta.

Mattress factory, cost $3,000, 5th St. E. for Dixon Manufacturing Co., 10th ave. E. General contractors, Rutty & Wears, Pender Wood Block. One storey, 30 x 150, frame construction.

Packing house, cost $10,000. Architects and general contractors, P. Burns & Company, East Calgary. Two stys., 66 x 178, mill construction. To be used as temporary premises until something definite has been decided re the whole plant.

Cabinet factory, cost $5,000, for Burnsland, Ltd., 8th avenue west. Builders & general contractors, Roger Bros., 807 9th street northwest. Two storeys, 40 x 75, frame, cement foundation. Excavating started.

Warehouse, cost $100,000, 10th avenue. Architects and general contractors, Hudson Bay Company. Six storeys, 75 x 130, brick and mill construction. Foundations in.

Ft. William, Ont.

Alterations to Pacific Hotel, cost $6,000, Simpson. Owner, A. Black. General contractor, C. Mathieu, Catherine street. Tile floors, bar fixtures.

Montreal, Que.

Four stores and six flats, cost $15,000 for Polydore Boileau, 48 St. Viateur. Architect, Zotique Trudel, 238 St. Andre. General contractor, P. P. Boileau, 48 St. Viateur. Three storeys, 47 x 90, concrete foundation, cut stone, structural steel and pressed brick construction, felt and gravel roofing.

Alterations to store, cost $11,500, Peel street, for Copland Estate, Summerhill ave. Architects, Hutchison, Wood & Miller, 50 Royal Insurance Building. General contractor, Louis Beaudry, 2320 Hutchison. Work includes cutting out front of residence; building extension to front and rear for store. One storey, 25 x 107, concrete foundation, cut stone and pressed brick construction.

Store and residence, cost $6,000, Ontario. Owner and builder, L. Cailloux, 280 Du Havre avenue. Three storeys, 25 x 53, concrete foundation, cut stone, frame and pressed brick construction.

Stores and flats, cost $16,000, Ontario and Chambly, for Eugene Sansregret, 365 St. Louis. Builders, Michel Bourdon & Fils, 527 Planet street. Three storeys, 49 x 49, frame and pressed brick construction, cement foundation, felt and gravel roofing.

Store and apartments, cost $10,000. Owner and builder, E. Simard, 2956 Esplanade. Three storeys, 50 x 80, stone foundation, brick construction, felt and gravel roofing.

Addition to factory, cost $40,000, for Wingate Chemical Company, Limited, 545 Notre Dame west. Architect, W. E. Doran, 189 Bleury street. General contractor, John Stewart, Bethune street. Iron and steel, Dominion Bridge Co., Lachine. Four storeys, 35 x 40.

Regina, Sask.

Stores, cost $10,000, Lorne, for F. N. Darke. General contractors, M. Diarmid & Donelly. One storey, 75 x 87, brick, brick foundation. Foundations in.

Ridgetown, Ont.

Extension to cannery for Dominion Canners, Limited. General manager, J. J. Nairn. General contractors, Cameron Bros. Two storeys, 175 x40.

Souris, Man.

Departmental store for D. A. Mackenzie & Company, Crescent avenue. General contractors, Kitchen Bros. For repairing store recently damaged by fire. Loss $20,000.

Toronto, Ont.

One pair stores and residences, cost $6,000, for J. Axler, 216 Royce avenue. Architects and builders, Hedley & Bradford, 90 Caledonian avenue. Two stys. and basement, 36 x 54, stone and brick foundation, brick and structural steel construction.

Factory, cost $9,000, 23 Paton road, for Jas. Edwards & Company, 126 Garden avenue. Architect and builder, E. B. Varey, 104 Lyndhurst avenue, will sub-let contracts. Two storeys, 50 x 110, reinforced concrete, structural steel and brick construction, stone and cement foundation.

Warehouse, Vine street. Owners and builders, Gibson, McCormick & Irwin, 26 Vine street. Architects, Ellis & Connery, Manning Chambers. No sub contracts. Stone and brick construction, felt and gravel roofing. Foundations in.

Factory, cost $10,000, King west, for Mason & Risch Piano Company. President, Thos. G. Mason. Architects, Bond & Smith, 19 Wellington west. Masonry and stone work, Elgie & Page, 18 Toronto street. Stone, brick and mill construction.

Machine shop, cost $6,000, Sterling road, for Bawden Machine & Tool Co., 22 Orillia street. General contractors, Standard Structural Company, 111 Manning Chambers. Steel work will be sub-

(Continued on page 71)

Tenders and For Sale Department

Town of Swift Current, Sask.

Tenders for Electrical Machinery

[illegible] tenders in connection [illegible] Monday, [illegible] of Monday, April 14th.

GEO. D. MACKIE,
[illegible] Engineer.

Tenders for Power House Equipment

[illegible] clearly marked [illegible] f the envelope "Tender for Power [illegible] t," and addressed to the City [illegible] at Regina, Sask., will be received [illegible] A[illegible] 30th [illegible] supply of:—

1 1200 kw. synchronous motor generator or motor converter set, complete with panel for the control of A.C. motor and generator panel, and equalizing pedestal for the control of [illegible]

Specifications may be had upon application to Mr. E. W. Bull, Superintendent of Light and Power, Regina, Sask.

A marked cheque for five (5 p.c.) per cent. of the amount of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
11 15 Superintendent of Light and Power.

CITY OF PORT ARTHUR

NOTICE

[illegible] tenders, endorsed on the envelope "Ten-[illegible] Material," will be received by [illegible] p to 5 o'clock p.m. of **Monday, March 31st, 1913**, for the supply of the following [illegible]way Material to be delivered F. O. B. cars Port Arthur, via Boat and Rail, before May 20th.

[illegible]

No. 2 0 Round Trolley Wire, 8 tons.
No. 4 0 Flexible Feeder Wire, D. B. W. P., [illegible] tons.

Tender B.
[illegible] ft. 80-lb. 5-in. Tee Rails.
[illegible] ft. 60-lb. 5-in. Tee Rails.
[illegible]
[illegible]
[illegible] r Angle Bars, 60-lb. Rail, 4 hole.
[illegible] ts, 3¼ x ¾ Hex. Nuts.
3,360 Bolts, 4½ x ⅞ Hex. Nuts.

Tender C.
Steel Intersections, Frogs, Switches, etc.

Further instructions as to specifications, blue prints, and form of tender may be obtained from the City Engineer and the undersigned.

A marked cheque for 10 per cent. of the esti-[illegible]unt of the contract must accompany [illegible]

[illegible] est or any tender not necessarily [illegible]

J. J. HACKNEY,
Commissioner Utilities.

Corporation Offices, Port Arthur,
March 5th, 1913. 11-13

Sealed tenders addressed to the undersigned, and endorsed "Tender for Repair of Headblock at Port Colborne, Ont.," will be received at this office until 4 p.m. on **Wednesday, April 9, 1913**, for the repair of the headblock of the east breakwater, at Port Colborne, County of Welland, Ont.

Plans, specification and form of contract can be seen and forms of tender obtained at this Department and at the office of J. G. Sing, Esq., District Engineer, Confederation Life Building, Toronto, Ont., and on application to the Postmaster at Port Colborne, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be given.

Each tender must be accompanied by an accepted cheque on a chartered bank, payable to the order of the Honorable the Minister of Public Works, equal to ten per cent. (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,
R. C. DESROCHERS,
Secretary.

Department of Public Works,
Ottawa, March 13, 1913.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.—37873. 12-13

TENDERS

Tenders addressed to the undersigned at Ottawa and marked on the envelope "Tender for Illuminating oil and oil for kerosene engines," will be received up to noon of the **Thirty-first day of March, 1913**, for the supplying and delivering about 150,000 gallons of illuminating oil and about 50,000 gallons of oil for kerosene engines, both made according to the specifications prepared by the Department of Marine and Fisheries.

The quantities mentioned herein are only estimates, and the Department reserves the right to order larger or smaller quantities as required.

Specifications and forms of tender can be procured from the Collectors of Customs at Toronto, Petrolea, and Sarnia, and from the Agents of this Department at Montreal, Quebec, St. John, Halifax and Charlottetown, and also from the Purchasing and Contract Agent, Marine Department, Ottawa.

Each tender must be accompanied by a deposit cheque equal to five per cent. of the total amount of the tender.

All tenders must be made on the tender form prepared by the Department.

No tender will be considered except for oil strictly in accordance with the specifications and put up in packages as called for in said specifications. Samples of the oils, cans and cases must be submitted.

The Department reserves the right to accept the whole or any part of a tender.

The lowest or any tender not necessarily accepted.

Newspapers copying this advertisement without authority will not be paid for same.

ALEX. JOHNSTON,
Deputy Minister of Marine and Fisheries.
Department of Marine and Fisheries.
—37841. Ottawa, February 24th, 1913. 12-13

TENDERS

Sealed tenders addressed to W. J. McCaffrey, Indian Agent, Maniwaki, Quebec, will be received up to noon, **Saturday, April 5, 1913**, for the construction of concrete abutments for a bridge over Conger Creek in the Maniwaki Indian Reserve, County of Wright, Quebec.

Plans may be seen at the office of the said agent or at the Department of Indian Affairs, Ottawa.

The lowest or any tender not necessarily accepted.

The unauthorized insertion of this advertisement in any newspaper will not be paid for.

J. D. McLEAN,
Assistant Deputy and Secretary.
Department of Indian Affairs,
—37677. Ottawa, March 3, 1913. 11-13

CITY OF REGINA

Waterworks Department

Sealed tenders will be received by the City Commissioners up till noon, 12 o'clock, **April 9th, 1913**, for the supply and delivery F.O.B. cars, Regina, of the following—

Contract B

Approximately—
77637 lin. ft. of 6-in. cast iron pipe.
7180 lin. ft. of 8-in. cast iron pipe.
2983 lin. ft. of 10-in. cast iron pipe.
1140 lin. ft. of 12-in. cast iron pipe.
9958 lin. ft. of 16-in. cast iron pipe.
10941 lin. ft. of 18-in. cast iron pipe.
16712 lin. ft. of 24-in. cast iron pipe.
96.02 tons Specials.

Contract C

Approximately—
105 tons ¾-inch lead pipe.
25 tons 1-inch lead pipe.
4500 lin. ft. 2-in. galvanized pipe and couplings.
500 lin. ft. ¾-in. galv. pipe and couplings.
1000 lin. ft. 1-inch black pipe.
123½ tons pig lead.
5 tons braided jute rope.

Contract D

Approximately—
150 2-in. brass gate valves.
271 6-inch iron body gate valves.
29 8-inch iron body gate valves.
4 10-inch iron body gate valves.
2 12-inch iron body gate valves.
15 16-inch iron body gate valves.
13 18-inch iron body gate valves.
13 24-inch iron body gate valves.
1 18-inch check valve.
348 valve boxes.
190 6-inch fire hydrants.
10 8-inch fire hydrants.

Contract E

Approximately—
1750 ¾-inch Corporation Cocks.
800 1-inch Corporation Cocks.
1750 ¾-inch Curb Cocks.
800 1-inch Curb Cocks.
300 ¾-inch lead to lead unions.
200 1-inch lead to lead unions.
150 1-inch four-way branches.
1500 No. 2 curb boxes.
200 No. 4 curb boxes.
200 curb box tops.

Specifications and other information may be obtained at the office of the undersigned.

A marked cheque for five per cent. of the bid must accompany each tender.

Lowest or any tender not necessarily accepted.

J. M. MACKAY,
12-14 Supt. of Waterworks.

CITY OF LONDON, ONT.

Tenders For

Highway Bridge

Over the River Thames

Sealed proposals addressed to the "Chairman and Members of No. 2 Committee," will be received at the Office of the City Clerk until 5 p.m. on Thursday, April 10th, 1913, for the following work:—

(a) Construction of concrete piers and abutments.

(b) Erection of Three 130 foot span riveted steel trusses.

(c) Construction of reinforced concrete flooring.

Each bidder shall make his tender on the form furnished by the City Engineer.

Plans and specifications and form of tender may be seen at and obtained from the office of the City Engineer.

Contractors to enclose a marked cheque for ten per cent. (10 p.c.) of the amount of their bid.

The City reserves the right to reject any or all bids and to accept any bid.

B. W. BENNETT,
Chairman No. 2 Committee.
H. A. BRAZIER,
11-13 City Engineer,

Tenders for Supplies

Sealed tenders, registered and clearly marked on the outside of envelope, "Tenders for Electrical Department Supplies," and addressed to the City Commissioners, Regina, Saskatchewan, will be received up until noon of March 29th, 1913, for the supply of:—

Section No. 1.—Weatherproof copper wire.
Section No. 2.—Western cedar poles.
Section No. 3.—Cross-arms.
Section No. 4.—Top-pins, insulators, etc.
Section No. 5.—Pole line hardware.
Section No. 6.—Pole type transformers.
Section No. 7.—Integrating watt meters, single, polyphase and two rate.
Section No. 8.—Metal flame arc lamps and station equipment.
Section No. 9.—Series cut-out mast arms for arc lights.
Section No. 10.—Underground material.
Section No. 11.—Fire alarm boxes and gongs.

Price to be F.O.B. Regina.

Copies of specifications may be had from E. W. Bull, Superintendent of Light and Power, Regina, Sask.

A marked cheque covering 5 p.c. (five per cent.) of bid must accompany each tender.

The City Commissioners reserve the right to reject any or all tenders.

E. W. BULL,
9 10 11 12 13 Supt. of Light & Power

To Engineers and Architects

Every man who puts in a tender must see your plans and specifications first. If you are in Montreal and he is in Vancouver the inspection of your plans is a problem. Let us solve that for you. Place on file copies of your plans and specifications in any or all of the "Contract Record" offices.

Contractors and manufacturers read the "Contract Record." It is the logical place to look for tenders called, and where most important works are advertised.

Send along your plans when asking for tenders put a line in your advertisement to that effect.

No extra charge is made for filing plans at one or all four offices

Contract Record and Engineering Review

Montreal 1331 Board of Trade
Toronto—220 King Street West.
Winnipeg Commercial Travellers' Bldg
Vancouver 429 Pender Street.

CITY OF VERNON, B. C.

Tenders for

500 B. H. P. Diesel Engine and 375 K. W. Generator

Tenders will be received up to 3 p.m., April **11th, 1913**, by D. G. Tate, City Clerk, Vernon, B.C., for the following equipment:—

Supply and installation of one 500 B.h.p. Diesel Engine.

Supply and installation of one 375 kw., 2300 volt, three phase, sixty cycle generator, with direct connected exciter.

Supply of one ten-ton travelling crane.

Specifications may be seen after March 20th, at the City Hall, Vernon, B.C., the offices of the Electrical News, and Canadian Engineer, Toronto; the Contract Record, Winnipeg, and the Consulting Engineers, Vancouver.

MATHER, YUILL & COMPANY, LTD.,
Consulting Engineers,
7 Vancouver, B.C.

CITY OF VERNON, B. C.

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Specifications may be seen after March 20th, at the City Hall, Vernon, B.C., the offices of the Electrical News, and Canadian Engineer, Toronto; the Contract Record, Winnipeg; and the Consulting Engineers, Vancouver.

MATHER, YUILL & COMPANY, LTD.,
Consulting Engineers,
12-14 Vancouver, B.C.

TENDERS

for

Cast Iron Valves and Specials

[illegible] will [illegible] only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Canada, up to noon on **Tuesday, April 8th, 1913**, for 24 inch, 30 [illegible] cast iron special castings.

[illegible] of the Waterworks Section, Department of Works, City Hall, Toronto.

[illegible] marked on the outside as to contents. The usual conditions relating to tendering, as prescribed by city by-law, must be strictly complied with. [illegible] derers shall submit with their tenders the name of two personal securities, approved by the City Treasurer, or in lieu thereof, the bond of a guar [illegible]

The lowest or any tender not necessarily [illegible]

[illegible]

City Hall, [illegible]
March 18th, 191[illegible]

Board of Education

Sealed new tenders, whole or separate, addressed to the Secretary-Treasurer of the Board, will [illegible]

Friday Noon, March 28th, 1913

for all [illegible]

Enlargement of Riverdale High School

also for

Floor Lights

Duke of Connaught and Clinton Street Schools

Lead, Oil, Turpentine, etc. for All Schools

[illegible] obtained at the office of the Superintendent of Buildings, City Hall. Each tender must be accompanied with an accepted bank cheque for five per cent. of the amount of tender or its equivalent in cash. Tenders must be in the hands of the Secretary-Treasurer, at his office in the City Hall, not later than 12 o'clock noon on the day named, after which no tender will be received.

The lowest or any tender will not necessarily be accepted.

W. O. McTAGGART,
Chairman of Committee.
W. C. WILKINSON,
13 Secretary-Treasurer.

Sealed tenders addressed to the undersigned, and endorsed "Tender for Concrete Revetment Wall at Burlington, Ont.," will be received at this office until 4 p.m., on **Monday, April 31, 1913**, for the construction of a concrete revetment wall along the shore front of Lake Ontario, at the Village of Burlington, in the Township of Nelson, County of Halton, Province of Ontario.

Plans, specifications and form of contract can be seen and forms of tender obtained at this Department and at the offices of J. G. Sing, Esq., District Engineer, Confederation Life Bldg., Toronto, Ont.; H. J. Lamb, Esq., District Engineer, Windsor, Ont., and on application to the Postmaster at Burlington, Ont.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures, stating their occupations and places of residence. In the case of firms, the actual signature, the nature of the occupation, and place of residence of each member of the firm must be [illegible]

[illegible] the order of the Honorable the Minister of Pub[illegible] contract when called upon to do so, or fail to [illegible] der be not accepted the cheque will be returned.

The Department does not bind itself to accept [illegible]

[illegible]

Ottawa, March 20, [illegible]

Newspapers will not be paid for this advertise[illegible]

[illegible]

McMyler Derricks For Sale

[illegible] hoisting [illegible] pile driver, steam hammer, [illegible] derricks, turnover [illegible] fuel [illegible] Address

Cleveland & Erie Machinery Co.
1515 Rockefeller Bldg., Cleveland, O.

TOWN OF WATROUS

Province of Saskatchewan

Notice to Contractors

Sealed tenders will be received by the Secretary-treasurer of the Town of Watrous until 8 p.m. on **Monday, April 14th, 1913**, for the following [illegible]

Contract A.—Labor for Laying Water Pipes and [illegible]

[illegible]

[illegible] tions, etc., may be seen at the Town Hall, Watrous, or at the Engineers' offices, Winnipeg and Toronto, on and after March 15th, [illegible]

No tender necessarily accepted.

E. MEADOWS, Esq., Mayor,

F. C. WRIGHT, Esq., Secretary-treas.,

CHIPMAN & POWER, Engineers,
Mail Bldg., Toronto, Ont.

13

City of Saskatoon

Material and Labor re Sewer and Water Extensions 1913

Sealed tenders, addressed to the City Commissioners and endorsed as per contents of each contract, will be received until 12 o'clock noon, **Tuesday, April 15th, 1913.**

Instructions to bidders, specifications and form of tender can be had on application to George T. Clark, City Engineer.

A deposit of $30 will be required for plans and specifications for labor on sewer and water extensions.

Contract No. 132.
Furnishing and delivery:—
130 Gate Valves, ranging in size from 6 in. to 24 in.

Contract No. 133.
Furnishing and delivery:—
75 Fire Hydrants.

Contract No. 134.
[illegible]
[illegible] hole Frames and Covers.
[illegible]

Contract No. 135.
Labor on Sewer and Water Extensions.

The Corporation reserves the right to let this contract in five sections. The approximate quantities are 9 miles of sewer and 9½ miles of water mains, and all the necessary manholes, valves [illegible]

Contract No. 136.
Furnishing and delivery of approximately 10 miles of cast iron water mains and necessary specials, ranging in sizes from 4 to 24 in.

Contract No. 137.
Furnishing and delivery of approximately 101,000 feet of sewer pipe and the necessary specials, ranging in sizes from 5 in. to 24 in.

F. E. HARRISON, Mayor,
Chairman of Commissioners.
Saskatoon, March 13, 1913. 13-15

CITY OF CALGARY

ASPHALT SUPPLY

Sealed tenders, marked "Tenders for Asphalt," and addressed to the City Commissioners, will be received by the undersigned up to 5 p.m. of **April 2nd, 1913**, for supplying the City of Calgary with 2,500 tons, more or less, of refined Asphalt, and 100 tons, more or less, of Asphalt Flux. Material, delivery, etc., as per specifications.

Specifications and information may be obtained from G. W. Craig, City Engineer.

An accepted cheque payable to the City of Calgary for five per cent. of the amount of the tender, must be attached to each bid.

Cheques will be returned to unsuccessful tenderers so soon as contract is executed.

The lowest or any tender not necessarily accepted.

J. M. MILLER, City Clerk.
Calgary, Alta.,
March 18th, 1913. 13

CITY OF BERLIN

Tenders for

TRUNK SEWER

Sealed tenders addressed to A. H. Millar, City Clerk, and endorsed "Tender for Trunk Sewer," will be received up to 5 p.m., **April 17th, 1913**, for:—

1. The supply of approximately 11,913 lineal feet of 48-inch reinforced concrete sewer pipe.
2. The supply of approximately 3,265 lineal feet of 30-inch salt glazed vitrified sewer pipe and approximately 5,393 lineal feet of 18-inch salt glazed vitrified sewer pipe.
3. The laying of approximately 11,913 lineal feet of 48-inch concrete sewer and approximately 1,074 lineal feet of 30-inch sewer.
4. The laying of approximately 2,191 lineal feet of 30-inch sewer and approximately 5,393 lineal feet of 18-inch sewer pipe.

Plans and specifications may be seen at the office of Herbert Johnston, City Engineer.

The lowest or any tender not necessarily accepted.

HERBERT JOHNSTON,
City Engineer,

13

CITY OF BERLIN

Tenders for

TRUNK SEWER

The Board of Works and Sewerage Committee will receive tenders addressed to A. H. Millar, City Clerk, up to 6 p.m., **April 3rd** next for the following for the year 1913:—

1. Laying Cement Walks.
2. Combined concrete curb and gutters.
3. Cast iron catch basin covers and manhole castings.
4. Concrete tile.
5. Sewer pipe.
6. Portland cement.
7. Curb irons.

Specifications may be seen at the office of the City Engineer.

The lowest or any tender not necessarily accepted.

A. H. MILLAR, City Clerk.
Berlin, March 17th, 1913. 13

BRIDGE TENDERS

Sealed tenders will be received up to **Saturday, April 5th**, for the construction of the following:—

(1) 157 foot steel bridge with concrete floor, at Glenallen for the County of Wellington.

(2) 80 ft. reinforced concrete arch bridge near Moorefield for the Township of Maryboro'.

Tenders for steel bridge are to be sent to C. G. Stickney, Windfield, and for the arch, to R. McArthur, Moorefield; or tenders may be handed in at the letting at Grayton on Monday, April 7th at 2 p.m.

For plans and other information apply to

BOWMAN & CONNOR,
13-14 36 Toronto St., Toronto, Ont.

Department of Railways and Canals

Car Ferry Terminal

Carleton Point, Prince Edward Island

EXTENSION OF TIME

The time for receiving tenders for "Car Ferry Terminal" at Carleton Point, Prince Edward Island, has been extended from 16 o'clock Tuesday, March 25th, 1913, to 16 o'clock Tuesday, the 1st April, 1913.

By order,
L. K. JONES,
Asst. Deputy Minister and Secretary.
Department of Railways and Canals,
Ottawa, March 20, 1913.

Newspapers inserting this advertisement without authority from the Department will not be paid for it.—38635. 13

The Corporation of the City of Cranbrook

Appointment of City Engineer

Applications are invited for the position of City Engineer for the Corporation of the City of Cranbrook.

Applicants would kindly state experience and salary required. Applications should be addressed to the undersigned so as to be received by March 29th, 1913.

T. M. ROBERTS, City Clerk.
Dated at Cranbrook, B.C.,
this 11th day of March, 1913. 12

Plant For Sale

2 Model 30 Marion Steam Shovels.

28 Steel Frame Petlor Dump Cars, 1½ yard, 24-inch gauge.

3 Western End Dump Cars, 3 yd., 36-in. gauge.

1 Beatty Travelling Derrick, 50 ft. boom.

40 tons 20 lb. Relaying Rail.

JOHN J. GARTSHORE,
12-13 58 Front St. West, Toronto.

FOR SALE

1250 tons second-hand flanged rails, in perfect condition, at low price, alongside at Montreal. T. J. M., 84 Brock Street, Kingston, Ont. 13

FOR SALE

One 50 h.p., 25 cycle, 3-phase, 550 volt C. G. E. induction motor. Complete with pulley base and starting box. Practically new. The Hespeler Furniture Co., Hespeler, Ont. 7-9

FOR SALE

Complete Sewer and Water Contractor's outfit, including one Parsons Trench Excavator, trench braces, fire pots, pumps, etc. For price and terms, apply to Navin Bros., contractors, Moose Jaw, Sask. 13-T.F.

For Sale

Dredge and Derrick and Tug, Portable Crusher, and 20 horse power Boiler and Engine, 12-ton Case Roller, "steam steerer," 19 Dump Waggons, Wheel and Drag Scrapers, Shovels, Hammers and Picks. All in good working order and cheap. Apply to H. A. Camjaigne, Niagara House, Niagara Falls, Ont. 10-T.F.

Wanted

One good second-hand stone crusher, complete; in good working order. Address Box 655, Belleville, Ont. 10-T.F.

We require an active representative in a number of towns throughout Canada to report on building and engineering work; to tell us where machinery, equipment, supplies and materials may be sold. It requires but a few moments daily to obtain the information we desire and should not interfere with your present occupation. Reply immediately, stating your qualifications.

MacLean Daily Reports Limited,
12-13 220 King St. West, Toronto, Ont.

Situations Wanted

Young man, University graduate, with several years' experience, would like position with reliable firm of architects. Apply Box 736, Contract Record, Toronto, Ont. 11-14

Electrical engineer, four years works experienced tester, four years operation of sub-stations, steam and hydraulic power house, wants position in charge of plant. Married. Best references. Box 752, Electrical News, Toronto, Ont.

Technical graduate, familiar with plant design, seeks position connected with design or construction of hydro-electric power plant; around Montreal preferred. Would like to start as designing draughtsman under supervision. Has followed engineering apprenticeship course with best manufacturing company. Speaks English and French. Best of references. Apply Box 749, Electrical News, Toronto, Ont. 7

Situations Vacant

WANTED [illegible] A.C. Generators. Box 751, Electrical News, Toronto, Ont. 7-9

WANTED Hydraulic and Electrical operator and maintenance man for large power plant in the East. Permanent position with good prospects of advancement for the right men. Plant in small town located directly on the railroad, one hour railroad distance to larger city. Applications with full particulars to be sent to Box 738, Electrical News, Toronto, Ont. 6-7

Business Buildings and Industrial Plants

(Continued from page 67)

let by General Contractors. Two stys., 40 x 60, brick foundation, structural steel and brick construction.

One pair stores and residences, cost $5,000. Owner and builder, G. E. Martin, 100 Wood street. Two storeys, 36 x 54, stone foundation, brick construction.

Vancouver, B.C.

Garage, cost $12,000, for H. A. Bowers, 1455 Georgia street. Architects, Doctor, Stewart & Davie, 803-4 Bower Building. General contractors, The B.C. Granitoid & Constructing Company, 142 Hastings street west. Two storeys, 66 x 132, reinforced concrete construction.

Stores and apartment house, cost $145,000, Howe street, for W. J. Bowser & G. I. Wilson. Architects, Parr, MacKenzie & Day, 570 Granville street. General contractor, E. J. Ryan, 768 Granville street. Marble and tile, The Western Tile & Marble Company. Brick, F. L. Dixon. Sheet metal, The Western Sheet Metal Works, 1253 Howe street. Electrical, NePage, McKenney & Company, Granville and Georgia Sts. Elevators, heating, plumbing and most of the equipment contracts will be let by architects. Four storeys, 85 x 120, brick and mill construction, pressed brick.

Victoria, B.C.

Store and apartment building, cost $30,000, for Dr. T. J. Jones, 1018 Government street. Architect, L. R. Hazeltine, Room, 3 McGregor Block. General contractors, Teed & Cummings 1010 Langley street. Heating and plumbing, Andrew Sheret, 1114 Blanchard street. Electrical, Hawkins & Hayward, 1607 Douglas street. Three storeys, reinforced concrete and brick construction, steel stairs.

Winnipeg, Man.

Addition to garage, cost $15,000, Portage avenue east. General contractors, Hicks Construction Company, 761 Corydon avenue. Permit issued.

Hotel, Albert street, for A. Farrard and P. J. Grogan, c/o Architects and General Contractors, Scott & Sedjack, Sterling Bank Building. Excavating done.

Residences

Hamilton, Ont.

Apartments, cost $15,000, King street east, for W. A. Noble, 80 George street. Architect, private. Three storeys, 30 x 70. Plans drawn.

Montreal, Que.

Residence, cost $12,000, for B. McNally, 110 Columbia avenue, Westmount. Architect, W. E. Doran, 189 Bleury St., Montreal. The calling of tenders was postponed. Same will now be received by Architect, from March 20th to 29th. Two storeys, 40 x 60, cement foundation, cut stone and pressed brick construction.

Ottawa, Ont.

Two residences, cost $10,000, Hopewell, for Samuel J. Lucy, 40 Glenn Ave. Stone foundation, brick veneer construction. Plans drawn.

Two residences, cost $10,000, for T. H. Brewer, 313 Riverdale. Architect, C. P. Meredith, 126 Sparks street. Plans are now with owner. Brick veneer construction, cement foundation.

Point Grey, B.C.

Residence, cost $20,000, for J. P. McConnell, c/o the B. C. Saturday Sunset 711 Seymour street. Architect, J. A. Radford, Granville Palace Hotel, 1221 Granville street. 2½ storeys, stucco and mock-timber construction. Plans in progress.

Port Credit, Ont.

Residence, cost $3,500. Tenders received by Architects, Mallory & Thatcher, 31 Queen west, Toronto, for all trades. Stucco and brick construction.

Toronto, Ont.

Bungalow, cost $4,000, for Roy G. Wilson, 12 Alhambra ave. Architect, R. Harris, 36 Howard Park ave. Owner will call for tenders. Stone and brick construction.

Residence, cost $6,000, for A. Kitteral, 441 Walmer road. Architects, W. F. Shepherd, 774 Shaw street. 2½ stys., 34 x 40, stone and brick foundation, brick construction. Plans drawn.

One detached residence, cost $3,300, for A. Knowlton, Lakefront and Silver Birch. Architects, R. J. Edwards & Saunders, 18 Toronto street. Two stys., 34 x 38, frame and brick construction, brick foundation. Plans drawn.

Two detached residences, cost $6,000, Lansdowne, for Griffin Bros., 109 McRoberts. Architect, P. H. Finney, 79 Adelaide street east, is preparing plans. 16 x 40 each, brick construction and foundation.

Residence, cost $3,500, Scarboro road, for Fred Teal, 89 Willow avenue. Architect, T. R. Hollingsworth, Kingston road and Malvern avenue. Two storeys, 20 x 36, brick construction and foundation. Plans drawn.

Residence, cost $3,800, Geoffrey, for T. J. Sharpe, 148 Westminster. Architect, J. W. Wright, 53 Fermanagh Ave. 2½ storeys, 25 x 32, brick construction, stone foundation. Plans drawn.

Residence, cost $3,800, Albany avenue, for R. H. Beare, 57 Hallam. Architect, T. L. Rowe, 11½ Melbourne. 2½ stys., 23 x 33, brick construction and foundation. Plans drawn.

Six detached residences, cost $24,000, Carey road, for Sharpe Construction Co., 19 Adelaide street east. Architect, Victor F. Gladman, Confed. Life Building. 2½ storeys, brick construction, stone foundation. Plans drawn.

Residence, cost $8,000, N. Madison Ave. Architects, Mallory & Thatcher, 31 Queen street west. 2½ storeys, stone and brick construction. Plans in progress.

Vancouver, B.C.

Residence, cost $8,000, [illegible] Heights, for T. P. Wilson, c/o McLennan, McFeely & Co., [illegible] Architect, J. H. Bowman, 615 Pender street west. Two storeys and basement, [illegible] construction. Plans in progress.

Apartment building, cost [illegible] avenue, for M. M. Harrell. Architect, M. L. Taylor, 207 Hastings street west, is receiving tenders for plumbing, heating, plastering, brick work and electrical contracts. Two

[illegible]

Apartment building, [illegible] street, for [illegible], c/o Architect, G. P. [illegible] Hastings street west. Four storeys and basement, 50 x 110, concrete foundation, [illegible], brick and mill construction. The heating, plumbing, elevator, ornamental iron and electric work will be let separately. Tenders received by Architect.

Waterloo, Ont.

[illegible] Hall- stead. Architects, Rentzel Bros. Two storeys, 42 x 38, Milton brick construction, stone foundation. Plans in progress.

Winnipeg, Man.

[illegible] & [illegible] 716 Notre Dame Ave., plan to erect several residences costing from $5,000 up, in Windsor Park. Work will start in about 2 months.

Residence, cost $5,000, Ashland Ave., for W. F. Duff, c/o Architect, Edgar Prain, 313 Fort street. Two storeys, 31 x 24, stone foundation, frame construction. Plans in progress.

Residence, cost $15,000, planned for J. P. Dumas, Fort Garry. Architect, D. R. Baribault, 607 Builders' Exchange, Winnipeg. Owner will install sewer system to river and filtration device. Garage tenders will be called later. Two storeys and basement, 37 x 44, stone foundation, Tyndall stone and brick veneer construction.

CONTRACTS AWARDED

Calgary, Alta.

Residences, cost $4,000, South, for J. H. Hinds, 1219 14th avenue west. Architects and general contractors, Webber & Cummins, 1610 30th avenue south. Two storeys, 30 x 30, frame construction, cement foundation.

Residence, cost $6,000, Mission. Architect and general contractor, H. J. Rowan, 825 14th avenue west. Two storeys, 26 x 34, frame construction, cement foundation. Excavating done.

Residence, cost $20,000, Mission. Owner and builder, R. C. Thomas, Thomas Block. Sandstone construction, stone foundation. Excavating done.

Residence, cost $10,000. Mr. Strome, 4th avenue west. Architects, Lang & Major, Board of Trade Building. Two storeys, 35 x 56, brick and frame construction, cement foundation. Plans in progress.

Edmonton, Alta.

Residence, cost $3,500, 25th. Architects and general contractors, Robinson & Halter, Box 1621. Two storeys, 27 x 28, brick foundation, frame construction. Excavating done.

Residence, cost $4,000, 25th, for J. W. Wallace. Architects and General Contractors, Speers, McFee Construction Co., 658 Jasper avenue west. Two stys., 24 x 29, cement foundation, frame construction. Excavating done.

London, Ont.

Residence, cost $3,800. Owner and builder, Wm. Walker, 383 Grosvenor. 1½ storeys, stone and cement foundation, white brick construction.

Two residences, cost $7,000. Owner and builder, F. E. Osborne, 51 Stanley street. 1½ storeys, stone and cement foundation, white brick construction.

Residence, cost $4,000, Woodman Ave. Owner and builder, Chesley Evans, Woodman avenue. Two storeys, pressed brick construction. Foundations in.

Montreal, Que.

Residence, cost $40,000 Plateau ave., for Roman Catholic Commissioners. Architect, G. A. Monette, 97 St. James St. General contractor, Alfred Mercure, 419 Labrecque. Five storeys, 40 x 70, cement foundation, cut stone and pressed brick construction, felt and gravel roofing.

Two residences, cost $5,000, Jerry and Huntley. Owner and builder, H. La Rose, 3683 St. Hubert street. Three storeys, 30 x 46, brick construction. Excavating started.

Residence, cost $7,000, Fabre and Gilford street. Owner and builder, F. F. Bissonnette, 343 Drolet. Architect, J. A. Ouellette, 250 Amherst. Three storeys, 32 x 52, brick construction. Excavating started.

Residence, cost $3,500. Owner and builder, H. Power, 2267 Notre Dame east. Three storeys, 25 x 40, stone and cement foundation, brick construction. Excavating done.

Residence, cost $4,000, Chambly street. Owner and builder, Ernest Pepin, 472 Valois. Three storeys, 25 x 42, stone foundation, brick construction, felt and gravel roofing. Excavating started.

Nine flats, cost $7,000, Chambly, for Simon Bourque, 2029 Ontario street east. Builder, Philippe Jauvin, 2029 Ontario street east. Three storeys, 50 x 50, cement foundation, brick construction.

Four flats, cost $5,000, Demontigny, for J. Bergeron, 285 Amherst street. Builder, Donatien Delorme, 280 Lepailleur. Two storeys, 40 x 40, brick construction, cement foundation, felt and gravel roofing.

Ottawa, Ont.

Apartment house, cost $20,000, for D. Fraser, O'Connor street. Architects, Horwood, Taylor & Horwood, 130 Sparks street. General contractor, W. A. Charlebois, 104 LeBreton. Brick veneer construction.

Residences, cost $5,000. Owner and General Contractor, Jno. McCracken, 249 Nicholas. Sub-contracts not let. Brick veneer construction, pine and concrete floors, felt and gravel roofing.

Residence, cost $7,000. Owner and builder, D. R. Thomas, Buena Vista Rd., Rockcliffe. Brick veneer construction, stone foundation.

South Edmonton, Alta.

Residence, cost $3,500, for Mrs. H. Duncan, Main street. Architect and general contractor, J. Sandford, 12 Sheppard Block. Two storeys, 24 x 30, cement and concrete foundation, frame.

Toronto, Ont.

One detached residence, cost $4,000, Sheldrake. Owner and builder, James Ramsey, 67 Blythewood road. Two storeys, 25 x 34, brick construction and foundation.

Two detached residences, cost $7,000, Westmount. Owner and builder, D. H. Griffin, 179 MacDonnell ave. 2½ stys., 22 x 34, brick construction, stone foundation.

Residence, cost $8,000, St. Clair Gardens. Owner and General Contractor, A. G. Saunders, 39 Havelock Avenue. Architects, R. J. Edwards & Saunders, 18 Toronto street. Sub-contracts to let by owner. 2½-storeys, 33 x 44, brick construction, stone foundation.

Two detached residences, cost $10,000, Oakmount. Owner and builder, H. M. King, Rear 15, Grove avenue. Two storeys, 24 x 36, stone foundation, brick construction.

Residence, cost $3,000, Indian Grove. Owner and builder, J. H. Hart, 78 Beaconsfield avenue. 2½-storeys, 26 x 28, stone foundation, brick construction. Plans drawn.

Victoria, B.C.

Apartments, cost $50,000, Cooke and Leonard streets. Dr. A. Pallant, c/o Architect, Wm. Frederick Gardiner, 347 Pender street west, Vancouver. General contractors, C. Mesher & Co., 322 Pemberton Bldg. Three storeys, 80 x 90, brick and mill construction.

Winnipeg, Man.

Residence, cost $8,800, St. John Ave. Architect and General Contractor, T. Goldstein, 367 Flora avenue. Permit granted.

Residence, cost $4,500, Machray Ave. Architect and General Contractor, A. Nordgren, 326 Bannerman avenue. Permit granted.

Two residences, cost $7,000, McMillan avenue. Architect and General Contractor, A.J. Anderson, 372 Edmonton St. Two storeys, 26 x 28, stone foundation, frame construction. Excavating done.

Two residences, cost $20,000, Grosvenor street. Architect and general contractor, R. Taylor, 117 Osborne street. 2½ storeys, 36 x 48, frame construction, concrete foundation. Excavating done. Three residences, cost $30,000. Architect and General Contractor, R. Taylor, 117 Osborne street. 2½-storeys, 36 x 48, frame construction, concrete foundation. Excavating started.

Power Plants, Electricity and Telephones

Battle Hill, Ont.

Geo. Cook, c/o N. Currie, Glencoe P.O., contemplates building a dam and installing power plant for manufacture of electricity for the district.

Ottawa, Ont.

Electric lighting service and fixtures, cost $250,000, contemplated by Ottawa Light, Heat & Power Company, Sparks street. President, Mr. Ahearn. Superintendent, Mr. Dion.

Swift Current, Sask.

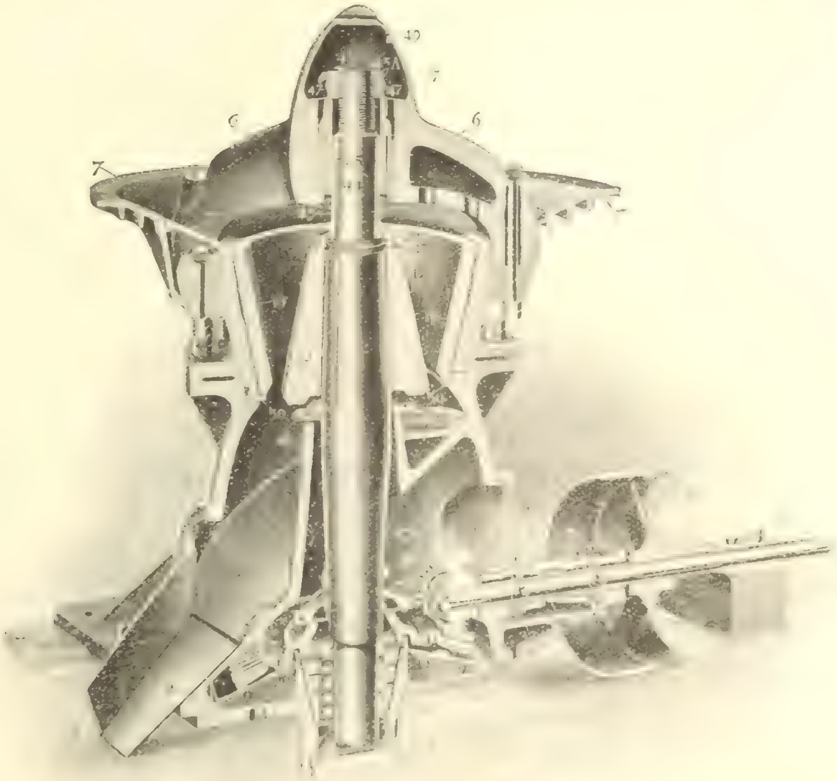
Tenders received by Sec.-Treas., Geo. D. Arnott, until noon April 14th, for 1-200 kw. and 1-400 kw a.c. generators, direct connected to high speed vertical engines or horizontal turbines. Specifications at office of Engineer. Geo. D. Mackie, engineer.

Vernon, B.C.

Tenders received by Clerk, D. G. Tate, until April 11th. For supply and installation of one 500 B.H.P. Diesel engine, one 375 kw. 2,300 volt, 3-phase, 60-cycle generator with direct connected exciter and 1-10 ton travelling crane. Specifications at offices of Clerk, Engineers and MacLean Daily Reports, Ltd., Toronto. Consulting engineers, Mather, Yuill & Company, Limited, 413 Granville Street, Vancouver, B.C.

THE OLD RELIABLE

GATES "K" BREAKER



SECTIONAL VIEW OF GATES "K" BREAKER

WHY GATES "K" BREAKER IS BEST

REQUIRES LEAST POWER TO OPERATE:—This machine will break more rock per horse power than any other ever made.

EASE OF FEEDING:—The style of spider gives large and unobstructed feed openings which do away with clogging and consequent loss of time in working.

UNOBSTRUCTED DISCHARGE:—No limit of capacity at this point.

HIGHEST RANGE OF ADJUSTMENT:—Provides ease in changing the sizes of product and great facility for taking up wear of the breaking surfaces.

TOP SUSPENSION OF SHAFT:—Prevents the bottom bearings running hot under the hardest work and makes adjustments easy.

STRENGTH AND RIGIDITY:—Due to the liberal proportioning of the parts.

COOL RUNNING:—Because of extra large bearings.

EASE OF MAINTENANCE:—Every detail has been carefully worked out and every part particularly designed to do its work. Each part is easily accessible.

CONCAVES CAN BE CHANGED WITHOUT DISTURBING THE SPIDER OR HOPPER:—Impossible with any other style of breaker.

See Bulletin 1448

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Lime,
Portland Cement,
White Cement,
Keenes Cement,
Plaster Paris,
Hard Wall Plaster,
Mortar Colors,
Fire Brick,
Sewer Pipe,
Weeping Tile,
Sacketts Plaster Board,
Parkers Corner Bead,
Rubble Stone,
Crushed Stone, etc.

With our 9 Branch yards situated as they are we are prepared to guarantee a prompt delivery service of any orders you may favor us with and would ask you to give us a trial in order that we might prove same to you and also prove the excellence of our material.

Ontario Lime Company, Limited

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Crown Office Building,
TORONTO, ONT.

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A Machine
Not a Machine Shop

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STATIONARY

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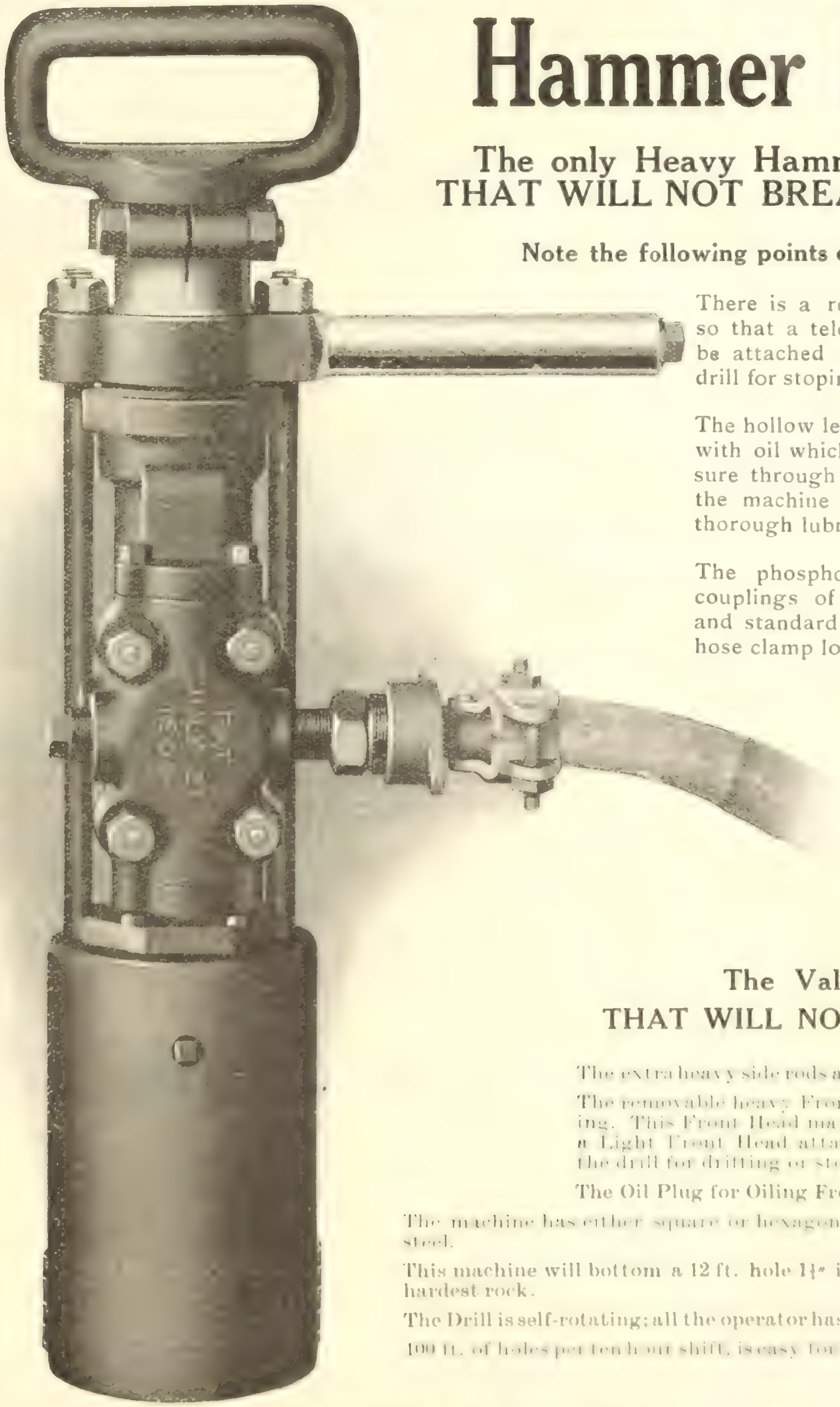
Tuec Co. of Winnipeg, 419 Portage Ave., Winnipeg, Man.
Tuec Co. of Calgary, 812 First Street W., Calgary, Alta.
James J. Martindale, 112 Mail Building, Toronto, Ont.
Tuec Co. of Montreal, 406 New Birks Bldg., Montreal, Que.

Send for Cat. A

The New McKiernan-Terry Class A-C Self-Rotating Combination

Hammer Drill

The only Heavy Hammer Drill THAT WILL NOT BREAK STEEL



Note the following points of interest:—

There is a removable handle so that a telescope feed may be attached when using the drill for stoping.

The hollow lever handle, filled with oil which is fed by pressure through the top head or the machine thus furnishing thorough lubrication.

The phosphor bronze hose couplings of large diameter and standard threads, with a hose clamp locked on.

The Valve THAT WILL NOT FREEZE

The extra heavy side rods and side rod spring

The removable heavy Front Head, for sinking. This Front Head may be removed and a Light Front Head attached when using the drill for drifting or stoping.

The Oil Plug for Oiling Front Head.

The machine has either square or hexagon chuck for hollow steel.

This machine will bottom a 12 ft. hole 1¼" in diameter in the hardest rock.

The Drill is self-rotating; all the operator has to do is to hold it.

100 ft. of holes per ten hour shift, is easy for this this machine.

For further information and price, write the

Canada Foundry Company, Limited

Head Office and Works TORONTO

Montreal Halifax Ottawa Cobalt Porcupine Winnipeg Calgary Nelson Vancouver Victoria Prince Rupert

RAILWAY CONSTRUCTION PLANT

Hoisting Engines, Horse Powers, Hand Winches, Derricks, Car Wheels, Axles and Boxes, Dump Cars, Rail Cars, Buckets

MARSH & HENTHORN, Limited

Makers of Hoisting Machinery **BELLEVILLE, ONT.**

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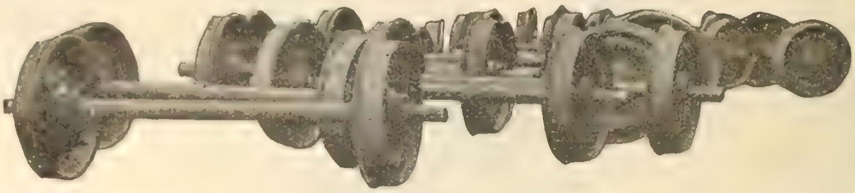
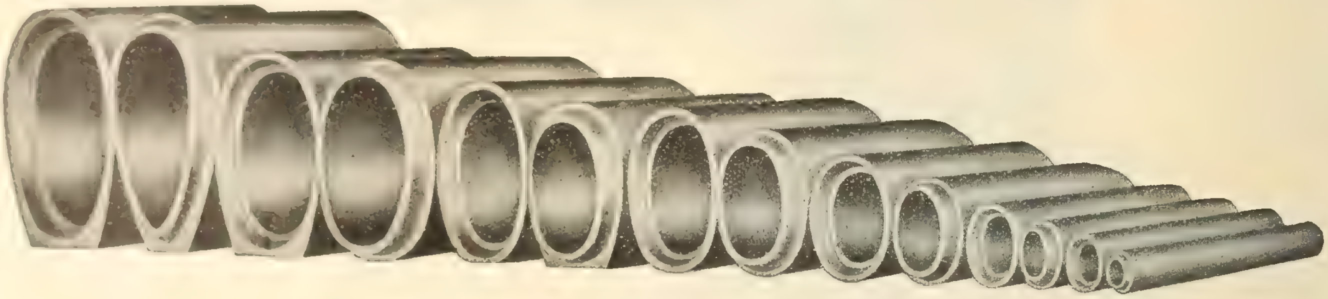
LIMITED

Montreal, Que.





Sewers and Culverts

properly built of properly made

- Reinforced Concrete Pipe -

LAST FOREVER.

OUR MATERIAL, SYSTEM and PRODUCT have been tested and approved by EMINENT ENGINEERS. NO RUST, NO ROT, NO FROST-BREAKS, NO PRESSURE-BREAKS, NO HIGH PRICES, NO DELAYS IN PROCURING, NO TROUBLE IN HANDLING.

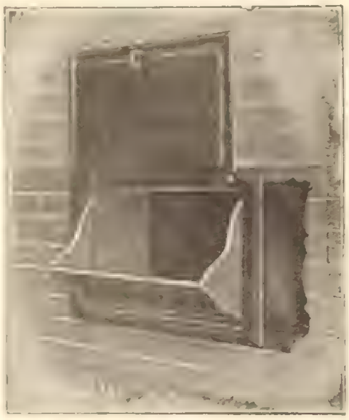
STANDARD REINFORCEMENT, or SPECIAL if required. Stock sizes 6 in. to 60 in.

Patronize Experienced and Reputable Manufacturers.

Catalogue and prices on application.

Dominion Concrete Company Ltd.

Kemptville, Ontario



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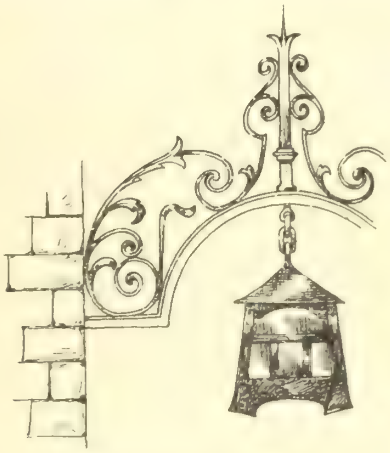

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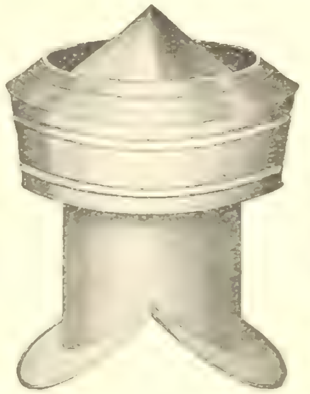

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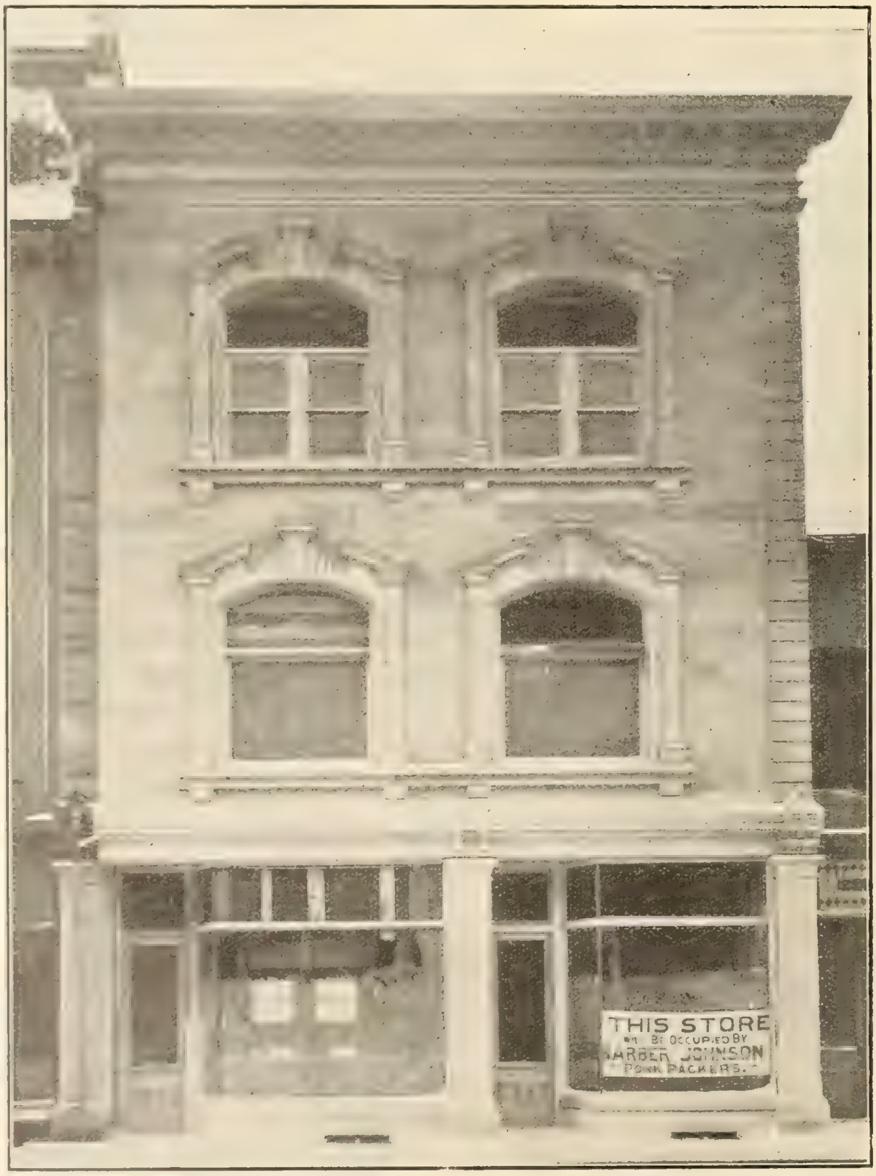

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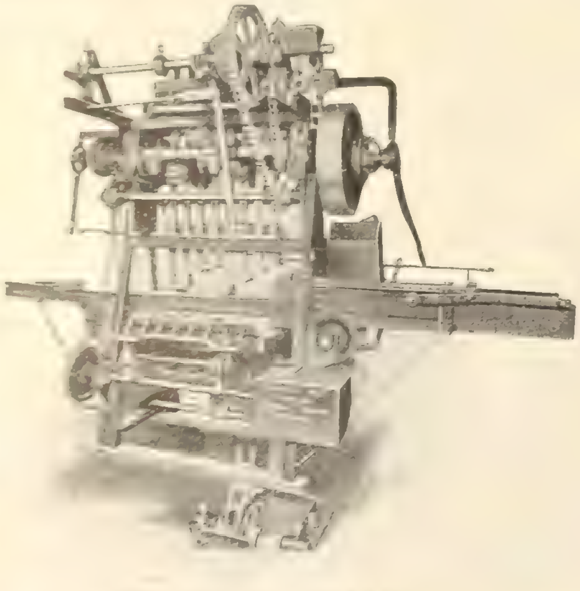

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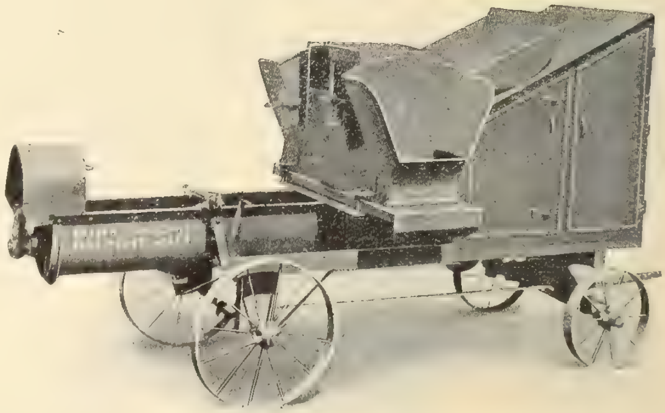

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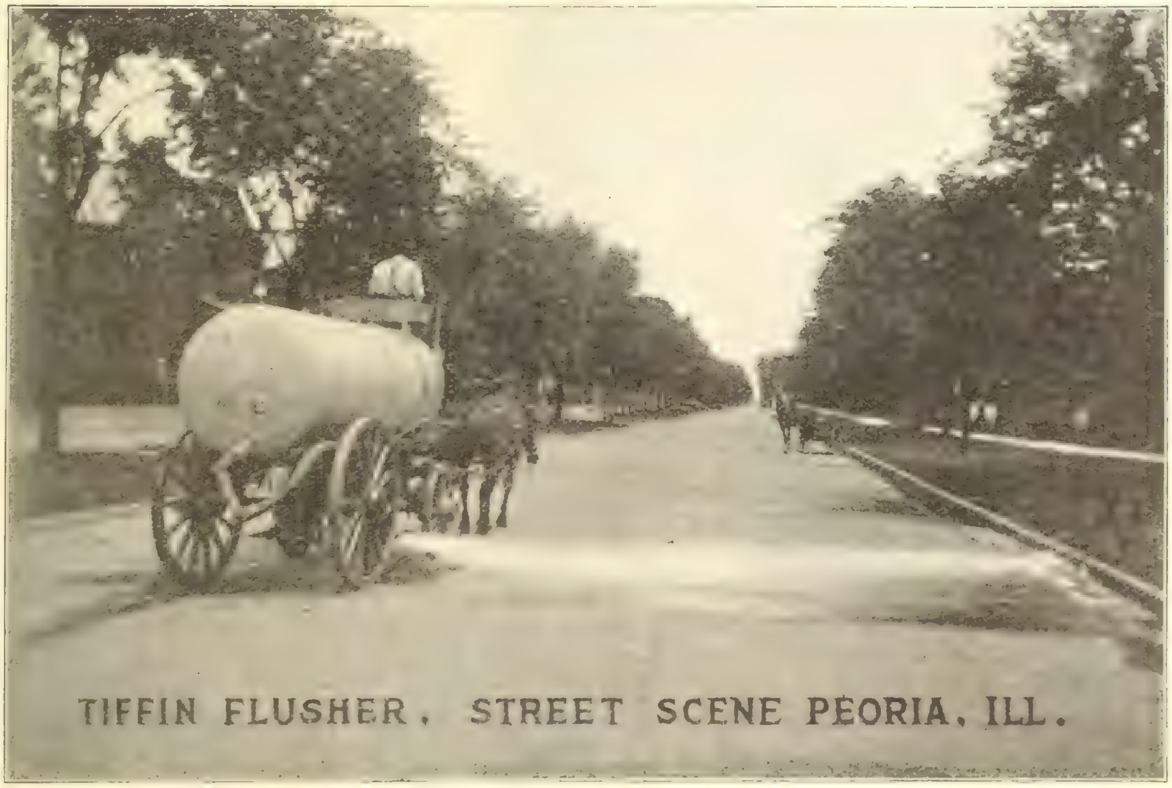

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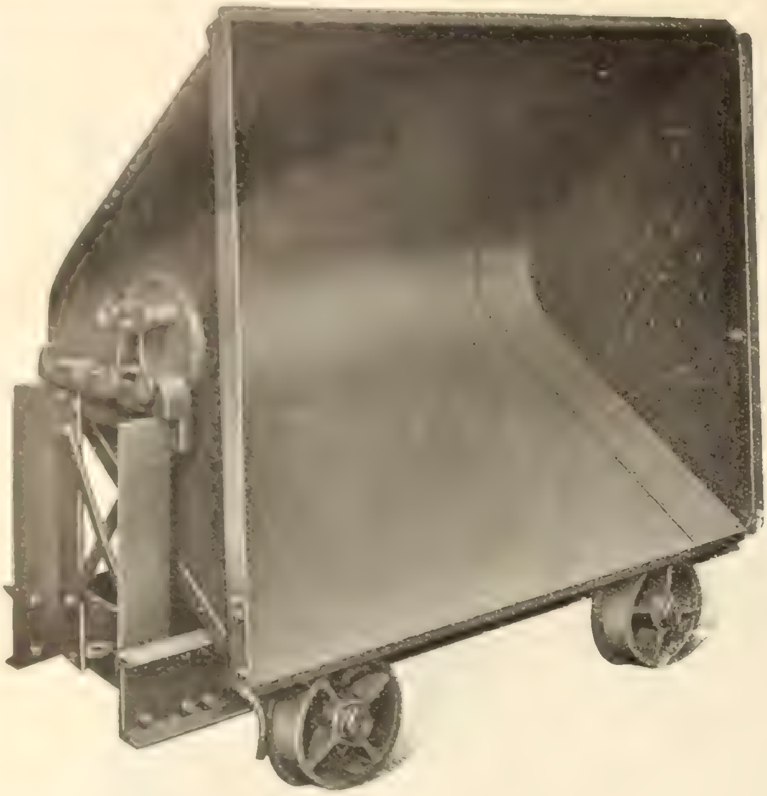

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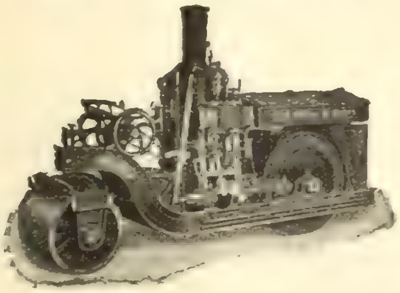

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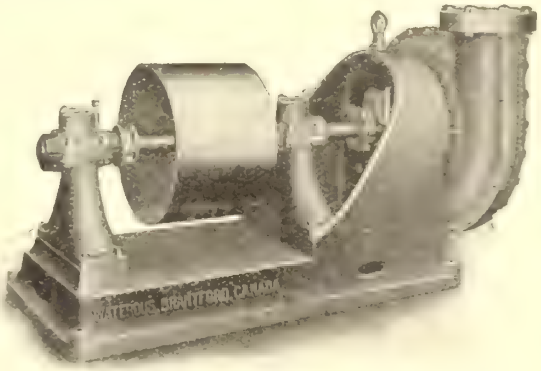

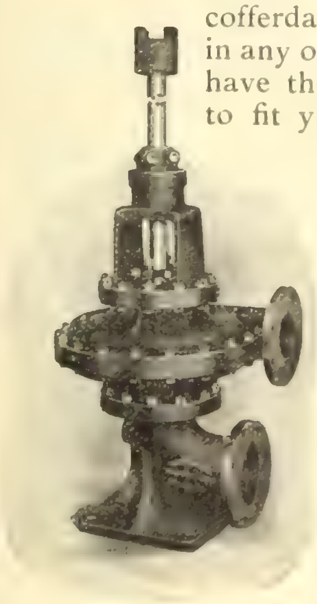

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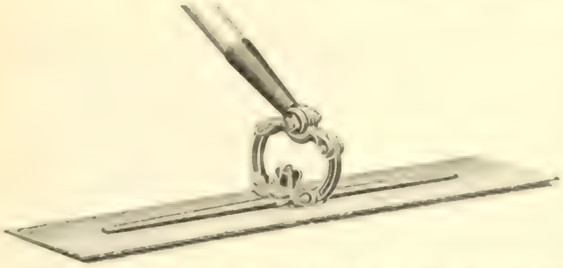

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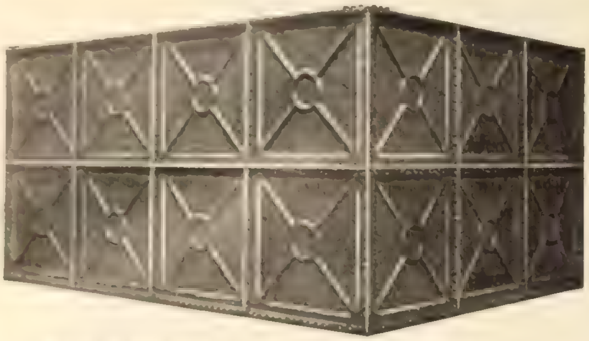

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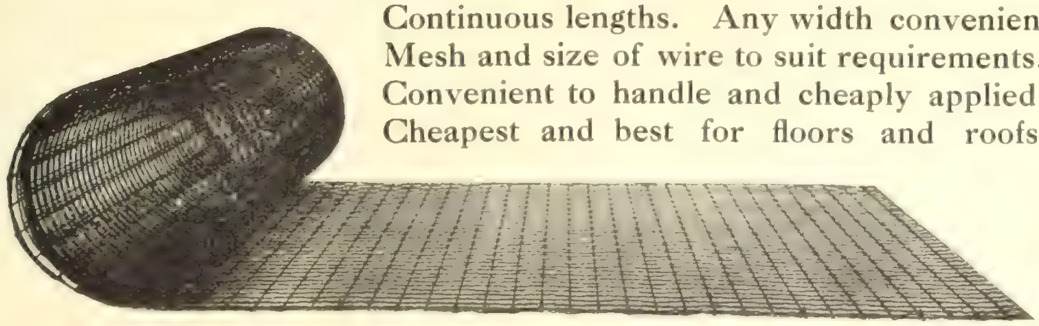

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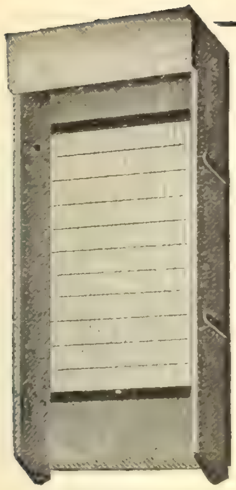

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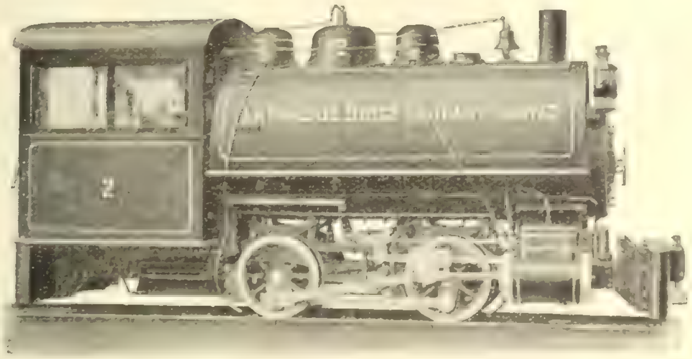

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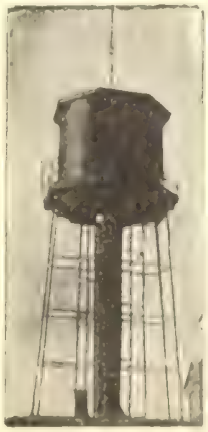

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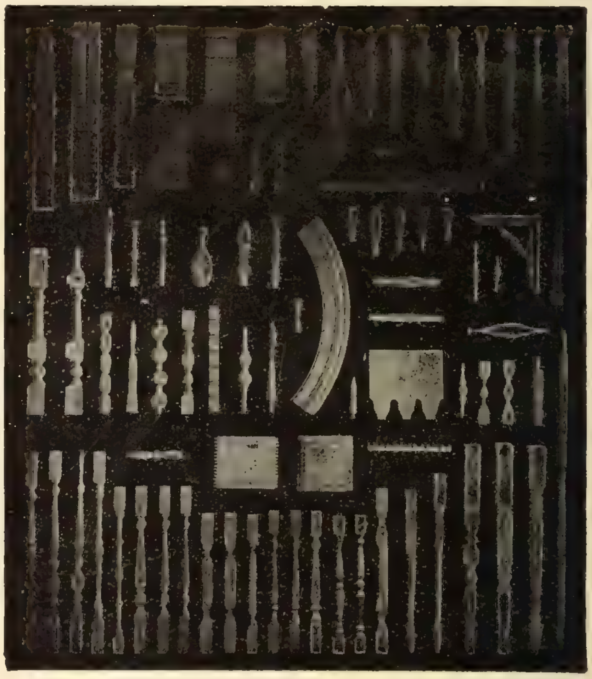

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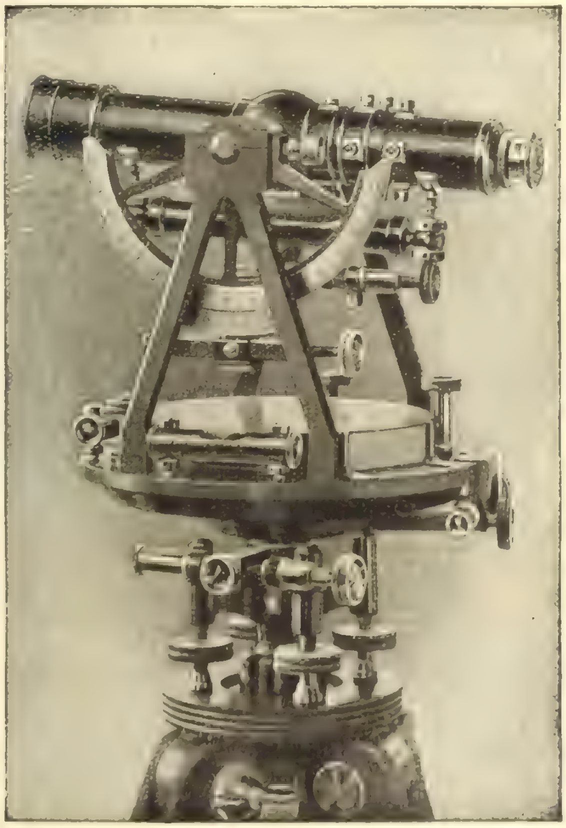

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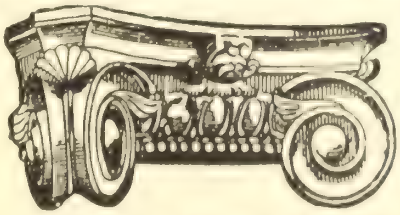

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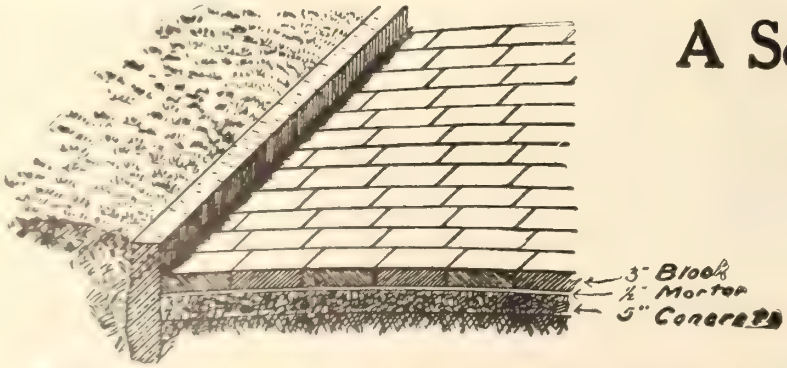

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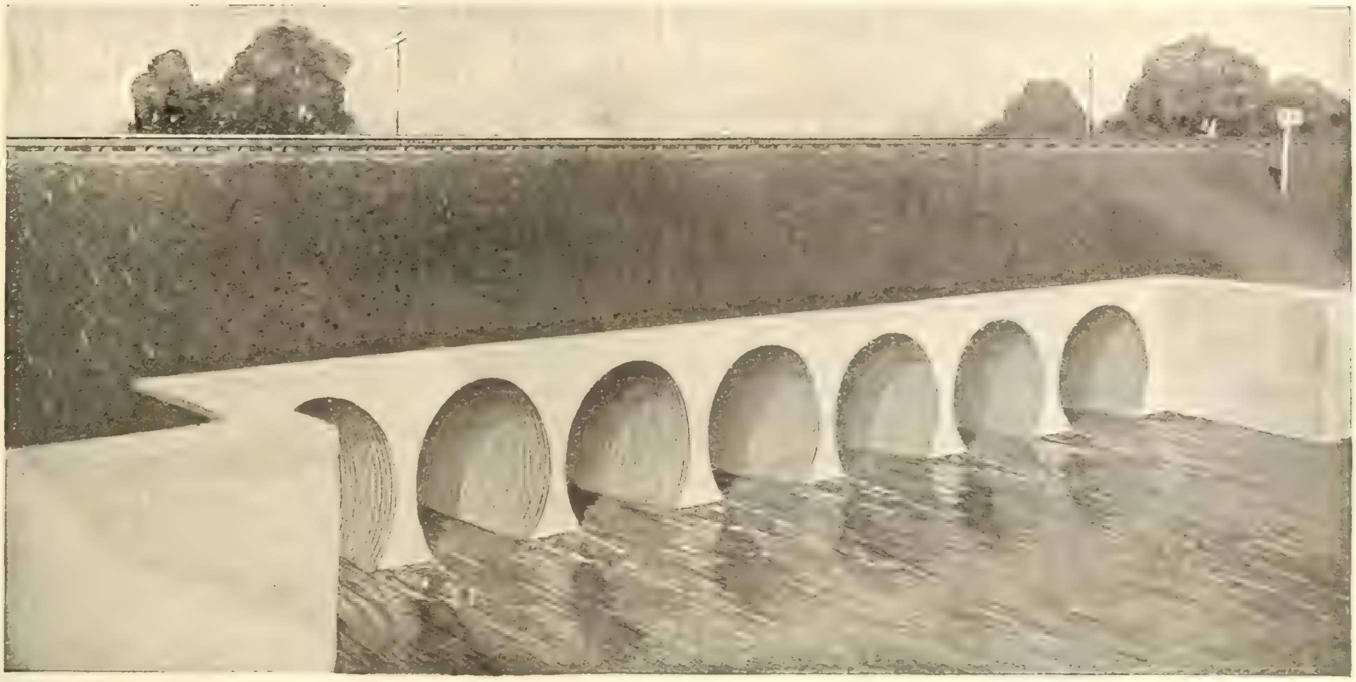

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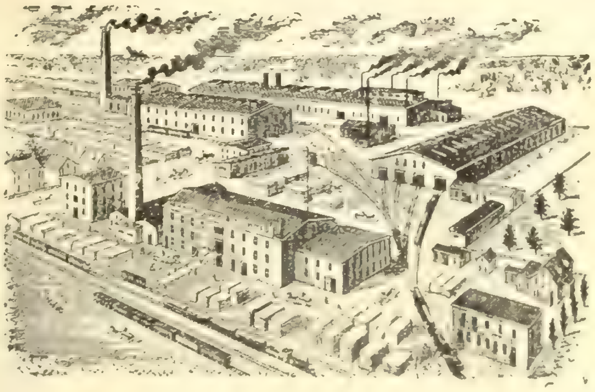

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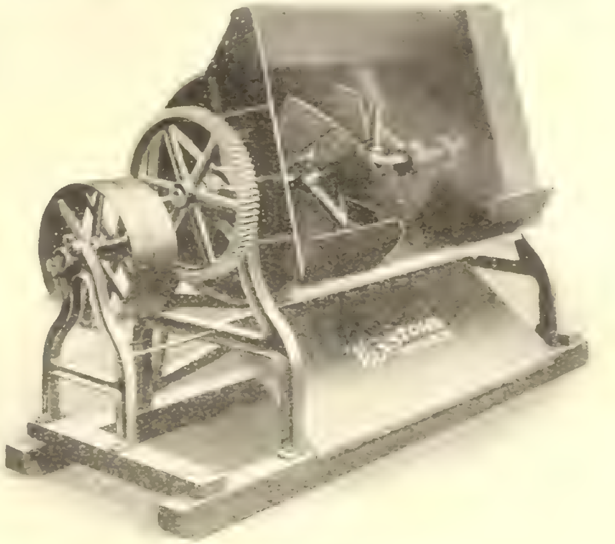

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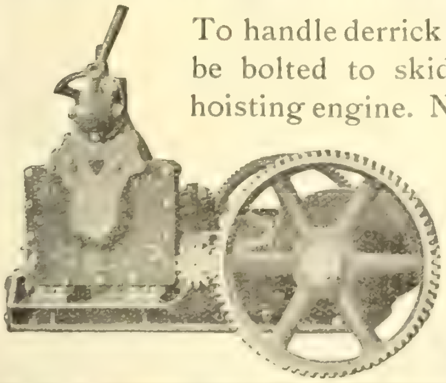

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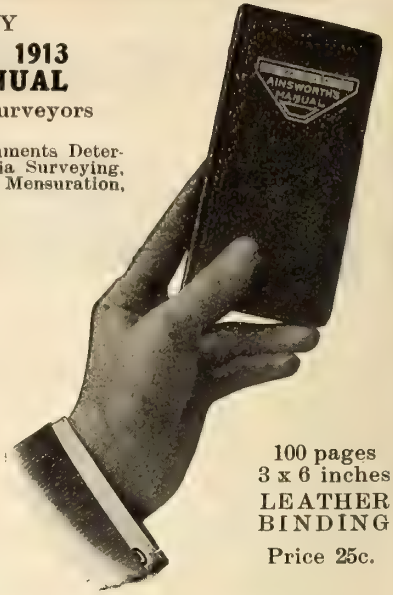

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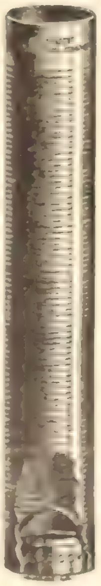

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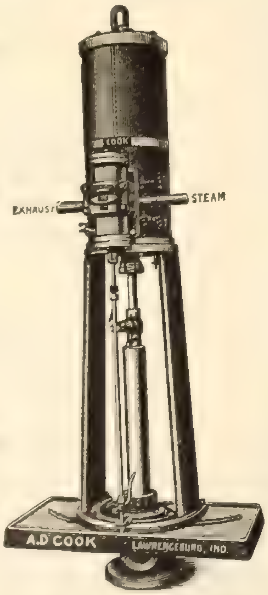

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26 to 40 "	4 60	6 75
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51 to 60 "	5 35	8 50
61 to 70 "	5 75	9 75
71 to 80 "	6 25	11 00
81 to 85 "	7 00	12 50
86 to 90 "		15 00
91 to 95 "		17 50
96 to 100 "		20 50
101 to 105 "		24 00
106 to 110 "		27 50

The following are wholesale prices for glass at Montreal and jobbing prices at Winnipeg for [illegible]

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	Star	D.D.
25	$3 25	$4 75
40	3 45	5 20
50	3 85	6 00
60	4 10	6 50
70	4 35	7 00
80	4 85	7 50
85	5 30	8 25
[illegible]		9 75
95		10 75
100		12 50

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71/80		9 00
81/85		10 00
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⅜ "	2.04	⅜ "	2.86
½ "	2.72	½ "	3.57
¾ "	3.16	¾ "	4.31
1 "	4.54	1 "	6.19
1¼ "	6.19	1¼ "	8.44
1½ "	7.43	1½ "	10.13
2 "	9.90	2 "	13.50
2½ "	15.80	2½ "	21.56
3 "	20.75	3 "	28.31

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4-in.	25c ft.	15-in.	1.35 ft.
6-in.	40c ft.	18-in.	1.90 ft.
9-in.	65c ft.	20-in.	2.25 ft.
12-in. .. .	1.00 ft.	24-in.	3.25 ft.

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Cement, wholesale, car lots, f.o.b. Toronto, bags extra, $1.55.

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Plain steel bars, $2.25.

Square twisted bars, ¾ to 1¼, $2.35.

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Free stone delivered, $15 to $16 per toise.

Brown coursing stone, delivered, $3.25 to $3.50 per yard.

Grey coursing stone, delivered, $2.25 to $2.50 per yard.

Sand, for cement or brick work, $1.15 a yard, f.o.b. Toronto siding.

Brown sills and heads, in the rough, delivered, 40 cents per foot.

Rubble stone in car lots, $1.40 per ton.

Steel channels and beams, $2.65 to $3.00 per 100 pounds, delivered f.o.b. Toronto.

Hard Wall Plaster, unsanded, $8.50, bags extra; sanded, $4.50 in car lots; hydrated lime, 9.00 in car lots.

Lime, per cwt., delivered, not less than 1,500 lbs. 33 cents; white, 43 cents.

Plaster of Paris, Anchor Brand, $1.50.

Manilla Rope, best, per pound, 12½ cents.

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Pure White Lead, ground in oil, $8.50 per 100 lbs.

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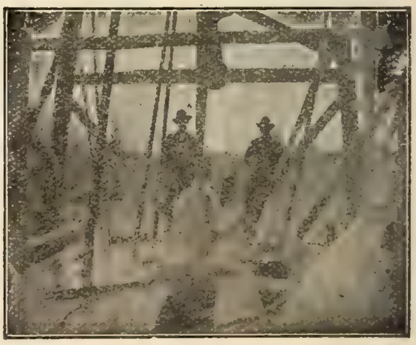

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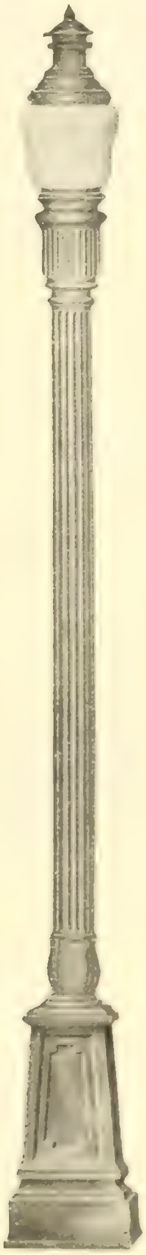

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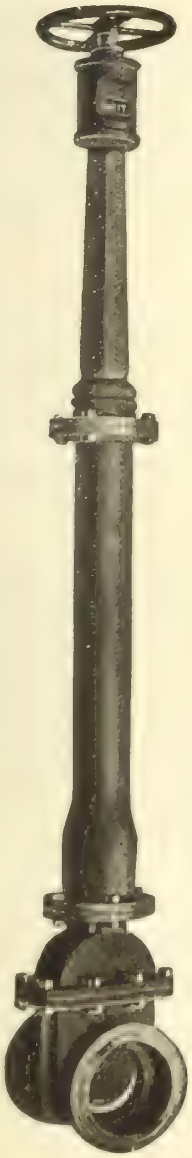

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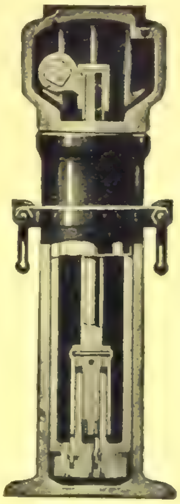

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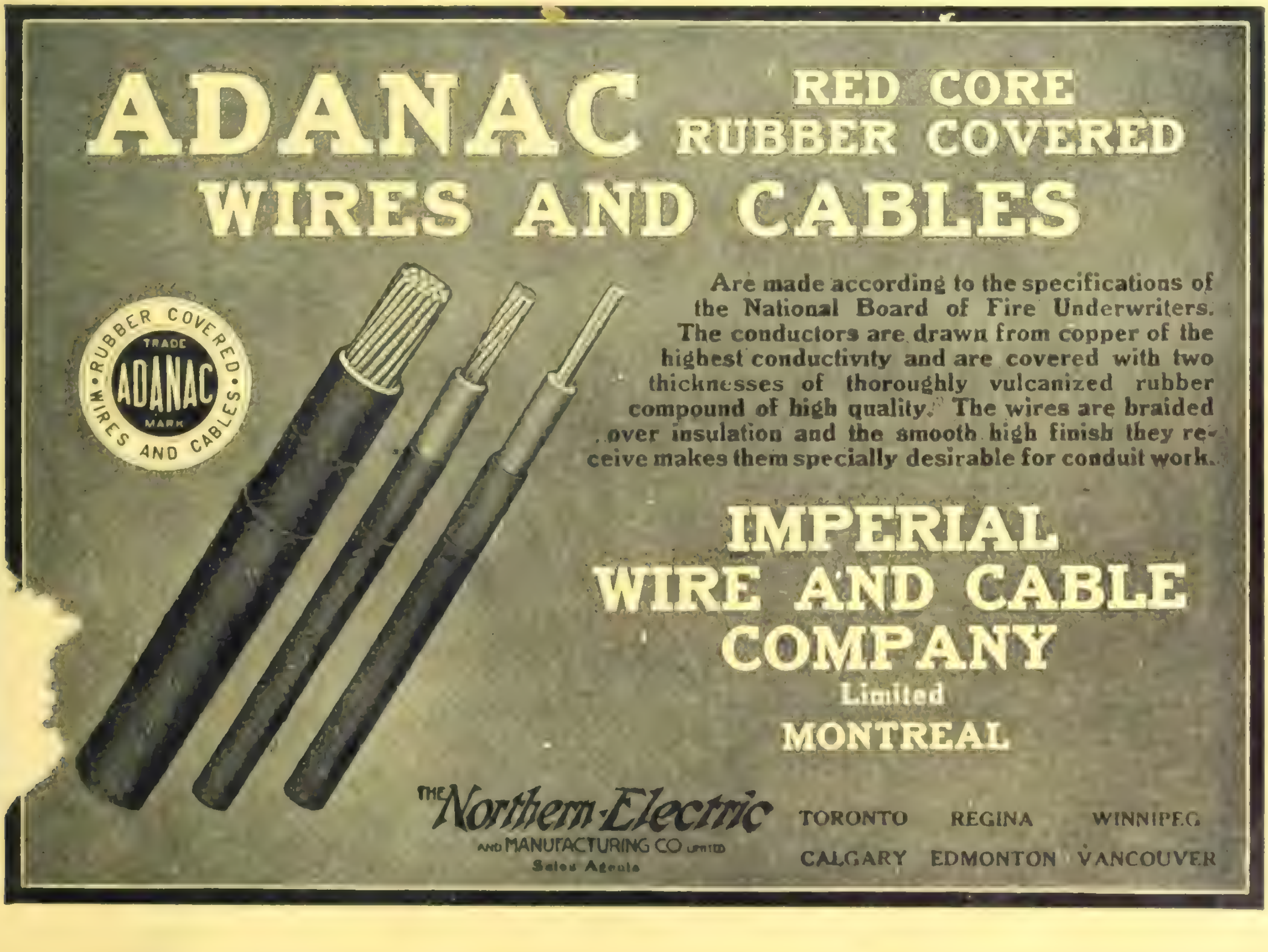
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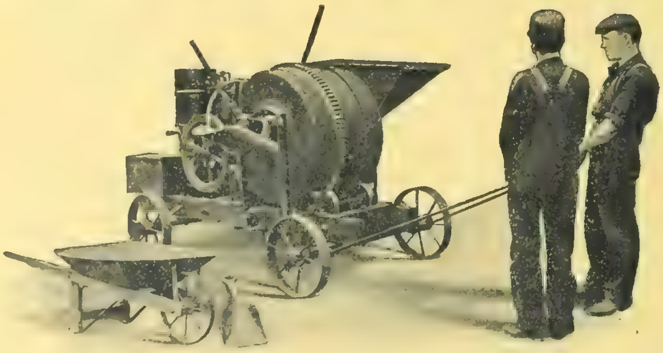

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